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Birds of a Limited Area in Eastern Kansas.

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IT IS the object of this report to set forth the significant facts and inferences which were obtained in 200 days of field work upon the environmental relations of the birds of a small area of ground chosen to typify the region of the Missouri river in Kansas. The work extended from August, 1921, until May, 1925. Unless stated otherwise, all the observations herein recorded were made within one and one-half miles of the townsite of Geary, Doniphan county, Kansas.

For each species of bird known to have occurred within the limits of this area at the time of this study an attempt is made to give concisely the facts learned which bear upon its frequency of occurrence and relative abundance; its local or habitat distribution; the factors which determine its presence and habitat distribution; and its annual cycle of activity. The area chosen proved to be an especially favorable one for such a study, because little was known of the bird life of that part of Kansas. A great variety of habitat conditions was present there, partly due to the influence of the Missouri river; and rapid changes in the habitat and their resulting effects upon the bird life could be studied.

A discussion of the habitat divisions of the area and of the general features of environmental relations of the birds has been given in the Wilson Bulletin (Vol. 40, 1928, pp. 157-177). For an account of the mammals of this area see the *Journal of Mammalogy* (Vol. 9, 1928, pp. 140-149). See Copeia (No. 164, 1927, pp. 75-82), for a brief treatment of the amphibians and reptiles of the area.

DISCUSSION OF SPECIES.

Podilymbus podiceps (Linnæus).

Pied-billed Grebe. (5.5.)*

The pied-billed grebe was generally found feeding and resting in the open water of the lake, although on two occasions birds of this

* Numbers in parentheses are percentages of frequence, which were obtained by dividing the number of days on which the species was recorded by the total number of days on which observations were made.

species were seen among scattered growths of *Typha*. Usually a single bird was seen; the largest number found together at one time being three. Two different times grebes were found in flocks of coot.

This bird was found in spring from April 21 until May 13, and in the fall from August 25 until November 18.

Larus argentatus Pontoppidan.

Herring Gull. (8.)

During the migrations this gull stopped to feed in the shallow water and on the mud at the edge of the lake. It was often seen resting on small sand bars in the river, on the ice of the lake, or on the mud at the edge of the lake.

In early spring this bird was usually seen singly or in small groups. About fifty were standing in the shallow water of the lake on April 1, 1923. A flock of about twenty-five came in and stopped, balancing themselves with outstretched wings for a moment after lighting. On the afternoon of April 6, 1923, a loose flock was seen flying down the river near the west bank. When flying, these birds almost always kept over the water.

The first record for this bird in 1923 is February 18. The first 1924 record is February 22. The latest spring record is May 3, 1924.

Larus delawarensis Ord.

Ringed-billed Gull. (3.5.)

A few of these birds were flying over the lake or standing in the shallow water on April 14, 15 and 26, 1923. On June 10 and 12, 1923, one stayed at the edge of a small pool in the center of the lake bed. A bird in immature plumage was shot on the river by duck hunters on November 3, 1923. This bird was given to the museum of the University of Kansas.

Larus franklini Richardson.

Franklin's Gull. (2.5.)

Large flocks of Franklin's gull were feeding in long lines back of plows in fields near the river on May 9 and 17, 1924. Several flocks were flying north over the lake on April 21 and May 18, 1924. On this late date they flew so high that they were almost out of sight, and they called as they flew over. Duck hunters shot one out of a flock on the river on September 16, 1923.

Larus philadelphia (Ord.).

Bonaparte's Gull. (5.)

Duck hunters shot two Bonaparte's gulls in a small flock that was flying down the river early in the morning of November 9, 1924.

Sterna forsteri Nuttal.

Forster's Tern. (2.)

Two males were collected from a flock that was feeding over Roundy lake on August 25, 1921. The terns were still numerous on the lake on August 27.

A small flock of Forster's terns was resting on a wire fence and in the shallow water at the edge of Doniphan lake on May 4, 1924.

Sterna antillarum (Lesson).

Least Tern. (21.)

A few of these birds were present during the early part of each summer. Throughout August of 1922 they were seen daily, but in August of 1923 only a few were seen.

Least terns were most often seen feeding at small pools cut off from the river, over the river, or over the lake. Several were watched that were feeding over the lake on August 9, 1922. They were securing small fish about two inches long, by diving from a height of about fifteen feet, and they were carrying them toward the river. Single birds arrived and left at frequent intervals.

On August 14, young terns appeared at the lake and attempted to catch fish. The adults were busy feeding the young. While being fed each young tern settled on the surface of the water and the adult approached and gave it food, but did not itself alight. Adults fed young as late as August 23.

When young birds were numerous during the last part of August, they were often seen sitting on the mud at the edge of the lake and among the feeding sandpipers.

From the direction that adults carried food from the lake, it was suspected that they had nests on some of the sandbars of the river in the summer of 1922, and that the nests were chiefly east of the lake. There was little evidence that they nested in the vicinity in the summer of 1923.

There was little tendency for these birds to form compact flocks except when resting on the mud.

The earliest summer record is June 4, 1923, when two or three

were circling over the river and catching fish. In 1922, this tern was last seen on September 7; in 1923, September 4 is the latest record.

Chlidonias nigra surinamensis (Gmelin).

Black Tern. (15.)

Usually, not more than half a dozen black terns were seen in one day. The largest number seen in one day was on June 3, 1923, when over one hundred were flying over the edge of Doniphan lake.

These birds were less restrictive in their choice of feeding grounds than were the other species of terns. They fed over the river, over the lake, on the mud at the edge of the lake, and once (May 17, 1924) they were seen following a plow in a field south of the lake and picking insects from the ground.

The black terns used logs, fence posts, and the mud around the lake for resting places. Sometimes they flew over the water and stayed within two feet of the surface and at other times they flew very high. Several times terns were seen sailing over the water with set wings.

The earliest date of occurrence in the spring is May 3, 1924. One was seen in immature plumage on June 23, 1922. As late as June 28, 1923, several were seen flying over the lake. In the fall of 1922 they were seen from August 9 until September 7. The only fall record for 1923 is August 25, when three were feeding over a pool along the river. The only 1924 fall record is for September 3, when one was seen feeding over the lake.

Phalacrocorax auritus auritus (Lesson).

Double-crested Cormorant. (1.)

Two double-crested cormorants were swimming in Doniphan lake on May 8, 1924, and one on May 18, 1924.

Pelecanus erythrorhynchos Gmelin.

White Pelican. (5.)

A flock of pelicans was seen resting on a sand bar in the river on April 21, 1924. On May 8, 9 and 10, 1924, a small flock was seen which was in almost the same place in the river each day. The birds were standing in the water and close together. Another flock was noted on a sand bar in the river on May 17, 1924. A flock was seen circling and flying north over the bluffs on April 8, 1923.

Pelicans were seen flying south in the fall on September 10 and 24, and October 7, 1922, and on September 10, 1923.

Mergus americanus Cassin.

Merganser. (3.5.)

The merganser was generally seen in pairs, swimming in the icy water of the river, although on two occasions it was seen on the lake. A female was shot on the river on November 18, 1922, by Mr. Frank Whittaker. This is the earliest fall record. March 3, 1923, when several pairs were feeding on the lake, is the latest spring record.

Mergus serrator Linnæus.

Red-breasted Merganser. (5.)

Two red-breasted mergansers were killed on the river by duck hunters on November 17, 1923. The head of one of them was examined and preserved and is now in the collection of the University of Kansas.

Anas platyrhynchos Linnæus.

Mallard. (23.5.)

The number of mallards present on the area varied from a few, to several thousand, depending upon the time of year and the favorableness of the season.

On December 2, 1922, a male was flushed from beneath a small bush that was hanging over the water on the creek one-half mile above the bridge. It rose from the water and flew a few feet, where it settled on a small pool. It repeatedly dived and swam back and forth for nearly half an hour until it was killed just before dark.

Mallards were seen feeding at various times on the lake, on the creek, in pools on the bar, and on the river.

On June 12, 1922, three were flushed on the north side of the lake that may have been young, just able to fly. They were in a small pond that was cut off from the rest of the lake.

The flocks that were on the lake on February 22, 1924, were divided into pairs. Throughout the spring the pairs of Mallard on the lake appeared to stay together. Most of the small flocks that were seen in the summer were made up entirely of males.

In the spring migrations of both 1923 and 1924 the largest number of mallards was seen during March. This bird was seen as late as June 7, 1923, and May 17, 1924.

On March 15, 1924, a flock that was flying up the edge of the river valley turned when it came to the creek and flew up the creek valley as far as it could be seen.

Anas rubripes Brewster.

Black Duck. (1.5.)

Duck hunters killed a female on the river, two miles south, on November 3, 1923. Another was killed at the same place on the next day. Several were reported killed on the lake, earlier in the season. The three that were examined had feet of the same color as those of the mallard.

Chaulelasmus streperus (Linnæus).

Gadwall. (1.)

Duck hunters killed a female on the lake on November 4, 1923. On March 29, 1924, three were feeding in the northwest part of the lake.

Mareca americana (Gmelin).

Baldpate. (1.)

One was killed on the river by hunters on October 27, 1922. Another was seen swimming with mallards in a small pool near the bluff and north of the lake, on March 29, 1924.

Nettion carolinense (Gmelin).

Green-winged Teal. (6.)

The green-winged teal fed in the shallow water at the edges of the lake during the migration seasons. It was generally present in small flocks.

The earliest spring record for this duck is March 3, 1923, and the latest spring record is April 21, 1924. Some were killed on the lake on October 29, 1923, and November 29, 1924.

Querquedula discors (Linnæus).

Blue-winged Teal. (21.5.)

The blue-winged teal was one of the most common ducks during the seasons of migration. During each season it was found in small flocks that stayed to feed on the lake and on the sloughs on the bar. On the lake it fed in the shallow water, on the mud around the edge, and in the growth of *Typha*. On September 12, 1923, several single birds were flushed from the large patch of *Polygonum* that was growing in the lake.

After the middle of April, flocks of this bird tended to break up into pairs.

This duck was found from April 2 until June 2, 1923, and from April 5 until May 30, 1924. In the fall it was one of the first ducks

to arrive. It was present in the fall of 1922 from August 21, when a flock of about twenty was feeding on the lake, until October 29. In 1923 it was observed as late as November 18.

Spatula clypeata (Linnæus).

Shoveler. (11.)

The shoveler was usually seen in small numbers feeding in the shallow water at the edge of the lake or on the mud nearby. On March 3, 1923, several pairs were feeding on the lake in water deep enough that they had to tip to reach the bottom.

All of this species that were seen in the spring were segregated into pairs of male and female. The shoveler was present from March 3 until May 13, 1923, and from March 29 until May 30, 1924. It was recorded on November 7 and 9, 1924.

Dafila acuta tzitzihoa (Vieillot).

American Pintail. (12.)

Pintail stopped in large numbers to feed in the shallow water of the lake. Often when the lake was covered with ice in the spring, flocks of this duck were seen standing on the ice, as on March 15, 1924. There was some open water in the lake at this time.

On the morning of February 22, 1924, there were several hundred on the lake, and they kept coming in in small flocks. These flocks tended to break up into pairs consisting of a male and a female. There was often as many as a dozen pairs in the air at one time. In the flight, the male generally followed the female.

The dates of occurrence in the spring are between January 29 and June 3, 1923, and between February 22 and May 3, 1924. Fall records are September 24 and October 29, 1922.

Aix sponsa (Linnæus).

Wood Duck. (12.5.)

The wood duck was seen more often and in greater numbers in 1921 and 1922 than in 1923 and 1924. During August, 1922, small groups were often seen flying down the river in the evening. At other times they were feeding in small groups or singly in the weeds or patches of *Nelumbo* in the lake.

A large flock was seen on the lake from August 25 to 27, 1921. On June 14, 1922, a group of six, that was flying over the lake, settled on the water. From August 5 until September 24, 1922, small flocks were seen frequently on the lake and on the river.

Dates on which this duck was found in 1923 are August 23 and September 5, 8 and 12. On October 11, 1924, a small flock was seen on the lake.

Marila americana (Eyton).

Redhead. (5.)

On the afternoon of April 21, 1924, a pair of redheads was swimming alone on the lake. Later they joined a small flock of *Marila affinis*. These birds were tame and allowed a close approach.

Marila affinis (Eyton).

Lesser Scaup Duck. (6.5.)

A female lesser scaup duck that was shot on April 7, 1923, on a pool below a spring, had its stomach filled with shells of small snails. These birds were usually found in small flocks on the lake. They were most often found in the deeper parts of the lake, although at times they were found in the shallow water. One was killed on the river on November 17, 1923.

Dates of migration are between April 7 and June 3, 1923; November 4 and 17, 1923; and February 22 and May 29, 1924.

Marila collaris (Donovan).

Ring-necked Duck. (.5.)

Hunters killed a ring-necked duck on the lake on November 17, 1923.

Chen hyperboreus hyperboreus (Pallas).

Snow Goose. (.5.)

A flock of about thirty birds that was flying down the river in a loose, irregular line on March 3, 1923, was identified as belonging to this form.

Branta canadensis canadensis (Linnæus).

Canada Goose. (3.)

March 3, 1923, three large flocks were seen on the river. One flock of about one hundred and fifty settled on a large sand bar in the river. April 2, 1923, ten birds were seen flying up the river in a loose line. They flew very fast with the strong wind. On February 3, 1924, a flock of 23 was seen flying northwest up the creek valley. On March 1, 1924, a small flock was flying northwest early in the morning. Some were heard calling overhead at night on March 28, 1924.

A flock of twenty-five stayed in the vicinity for nearly a week in the middle of March, 1925. They stayed on sand bars in the river during the day and just before dark they flew out each evening to a large wheat field on a hill where they stayed until morning, when they returned to the river.

A flock was flying down the river on November 9, 1924.

Botaurus lentiginosus (Montagu).

Bittern. (4.)

Single birds of this species were flushed from patches of *Polygonum, Nelumbo,* and other plants at the edge of the lake on September 4 and 10, 1922, September 8 and 12, 1923, and October 6, 1923.

Ixobrychus exilis (Gmelin).

Least Bittern. (1.5.)

A least bittern was flushed from a small patch of *Typha* in the south part of the lake in the middle of the forenoon of June 13, 1922. On August 12, 1922, one was shot at six o'clock in the morning. It was perched on a stem of *Typha* and about eight inches from the water. Several were flushed from patches of *Typha* in shallow water in the north part of the lake on May 30, 1924.

Ardea herodias herodias Linnæus.

Great Blue Heron. (39.5.)

Great blue herons were often seen standing in the water or feeding at the lake. They were found in patches of *Typha, Polygonum, Nelumbo,* as well as in the open water and on the mud flats. They were sometimes seen on sand bars in the river or at the edges of pools that were cut off from the river. A few times in late summer they were found feeding along the creek.

Usually not more than six of these birds were seen in a single day.

Although individuals of this heron were present during the entire summer, they were not found actually nesting. On May 6, 1923, three single birds of this species were seen flying to the river from a westerly direction over the bluff. They arrived about ten minutes apart, and may have been from some nesting ground.

On March 30, 1923, one was seen in the center of the lake at sunrise and another was feeding in the water there at about ten o'clock in the morning. The water was about eight inches deep. The bird flew a short distance, and after alighting it reached into the water for a fish which it swallowed. The swallowing was accompanied

by rather violent jerks of the neck. After a few minutes the bird moved and captured another small fish. This fish was thrown into the air and caught three or four times and then swallowed head first. The heron left after about ten minutes.

The latest fall record for this bird is October 29, 1922. The earliest spring record is March 29, 1924. In 1923 it was first seen on March 30.

This heron was often heard calling on the lake, especially in late summer and early fall.

Florida cœrulea (Linnæus).

Little Blue Heron. (1.)

On September 2, 1924, a single little blue heron in white plumage was feeding on the mud and in the shallow water at the edge of Doniphan lake, and on September 3 a loose flock of twelve, in the white plumage, was seen at the edge of Roundy lake.

Butorides virescens virescens (Linnæus).

Green Heron. (36.5.)

As a rule, only one or two green herons were seen in one day, but in August and early September they were more numerous, and groups of twelve or more birds were often seen. One such a group was seen that was in water about three inches deep in the lake on August 14, 1922. Some were wading in the edge of the *Typha* and were even climbing among the stems of that plant. The birds squawked as they moved about. When a shotgun was fired nearby the birds did not fly, and they appeared to be not disturbed. Sometimes these herons rested on the mud at the edge of the water, sometimes on the piles of drift along the river or the creek, and sometimes in the willow and cottonwood trees on the bar.

This heron fed at the edge of the lake, often in patches of the various kinds of vegetation along the creek, along the river, and in pools on the bar.

The only nest that was seen of this species was found on June 5, 1923. It was in the top of a small cottonwood on the bar near the mouth of the creek. It was about one hundred yards from the river. The nest was near the main trunk of the tree and was about twenty feet from the ground. There were eggs in the nest, but the number was not determined. The sitting bird left when the nest was approached and returned in about fifteen minutes. The weeds that were growing beneath the nest were covered with white excreta of this species.

April 28, 1923, is the earliest date on which this bird was recorded in spring, and September 24, 1922, is the latest date of its recorded presence in the fall.

Nycticorax nycticorax nævius (Boddært).

Black-crowned Night Heron. (7.5.)

This heron was flushed from the tops of cottonwoods along the river and from the exposed mudflats around the edges of the lake. It was found in trees more often than were the other herons, and when flying it was usually at higher altitudes than were the others. It appeared to be more wild than the others, and it squawked more than they did.

Several were seen on the lake on August 25, 1921. On June 19, 1922, four in immature plumage flew from some *Typha* at the edge of the lake to the trees near by. In the fall of 1922 this species was seen on August 11, 23 and 31, and September 4, 7 and 10. In 1923 it was found on May 13 and June 5, 6 and 10. In 1924 it was found on April 21 and May 30.

This bird was usually present in small, compact flocks of fewer than eight individuals.

Rallus virginianus Linnæus.

Virginia Rail. (1.5).

On September 10, 1923, a female of this species was found in a weedy pasture. It had been crippled, but was able to run. There was a telephone wire on the north side of the pasture which the bird may have hit in its migration flight. On September 3, 1924, one was flushed that was in *Typha* at the edge of the lake.

Porzana carolina (Linnæus).

Sora. (4.)

Soras were flushed in *Typha* and *Nelumbo* at the edge of the lake. Dates of occurrence in spring are between May 8 and 17, and in the fall between August 28 and September 12.

Fulica americana Gmelin.

Coot. (16.5.)

The number of coot present at one time varied from a few to several hundred. This species was found in the open water of the lake, on the mud at the edge, and in the *Nelumbo* and *Typha*. Usually the flocks were not very compact. When the birds were feeding they often dived and picked up food from the bottom. A

large flock that was feeding on the mud at the edge of the lake on May 17, 1924, ran into the water when it was approached.

In the spring these birds were often heard calling, and they were rather tame. In the fall, when many were shot by duck hunters, they became very wild and hard to approach.

In 1922 a group of seven was present on the lake as late as June 19, when they were seen swimming in the edges of patches of *Typha*.

April 4, 1924 is the earliest spring record for this species, and November 30, 1923, is the latest date of its recorded occurrence in the fall. The earliest fall record is September 6, 1923.

Steganopus tricolor Vieillot.

Wilson's Phalarope. (1.5.)

A few individuals of this species were feeding with the sandpipers at the edge of Doniphan lake on May 11, 13 and 20, 1923, and on May 8, 1924.

Gallinago delicata (Ord.)

Wilson's Snipe. (5.)

This bird was found in small numbers, usually less than four, and it preferred those portions of the lake shore that were grown up with vegetation. It was also found at the edges of pools on the bar below springs and along sloughs.

Spring records are between April 2, 1923, and May 8, 1924. Fall dates of occurrence are October 29, 1922, and November 8, 1924, when one was seen at the edge of a pool in the creek.

Limnodromus griseus scolopaceus (Say).

Long-billed Dowitcher. (1.)

A single bird was feeding at the edge of the lake on September 4, 1922. Two birds at the edge of Doniphan lake on May 18, 1924, were approached to within fifty feet.

Micropalama himantopus (Bonaparte).

Stilt Sandpiper. (.5.)

One shot out of a small flock in the shallow water at the edge of Doniphan lake on May 18, 1924.

Pisobia maculata (Vieillot).

Pectoral Sandpiper. (18.)

The pectoral sandpiper was found in flocks which varied in size from one or two birds up to several hundred and which fed in the shallow water and on the mud at the edge of the lake.

In the spring of 1923 this sandpiper was present from March 30 until June 7. In the fall of 1922 it was present from August 10 until October 8.

Pisobia fuscicollis (Vieillot).

White-rumped Sandpiper. (3.)

This bird was feeding with other sandpipers at the edge of the lake on August 22, 28 and 31, and September 7, 1922; June 7, 1923; and May 18, 1924.

Pisobia minutilla (Vieillot).

Least Sandpiper. (13.5.)

This sandpiper fed on the mud around the lake in larger numbers than any of the other species of sandpipers. Records of its occurrence in spring are between May 3, 1924, and June 7, 1923. In the fall of 1922 it was present between August 9 and September 10.

Ereunetes pusillus (Linnæus).

Semipalmated Sandpiper. (4.)

The semipalmated sandpiper was found in about the same places and at about the same time as the least sandpiper.

Limosa hæmastica (Linnæus).

Hudsonian Godwit. (1.)

On May 13, 1923, a flock of nine was wading along the west side of Doniphan lake in water about four inches deep. Another that was crippled stayed by itself on the mud, but not in the water. When it was approached to within ten yards it would fly out over the water and sail back to shore. A small pool of blood was left after each stop. Once it squatted on the ground until it was approached closely. The flock separated at one time and a part flew a short distance along the edge of the lake.

On May 17, 1924, two stopped with other shore birds on the north edge of the lake.

Totanus melanoleucus (Gmelin).

Greater Yellowlegs. (2.)

The greater yellowlegs was found on the lake on September 4 and 7, 1922; April 14, 1923; and April 21, 1923. Only a few individuals were seen at each time.

Totanus flavipes (Gmelin).

Yellowlegs. (18.5.)

In the spring and fall the yellowlegs fed at the lake both in the shallow water and on the mud at the edge. On April 21, 1924, some were seen feeding on the mudflats along the river.

On April 28, 1923, these birds made much more noise and were much more restless than they had been two weeks before.

On August 14, 1922, a large flock flew to the lake and settled at about six o'clock in the evening.

Usually several small flocks fed at the lake at one time. On March 30, 1923, the earliest spring record was made, and the latest spring record was made on June 3, 1923. In the fall this bird was seen between August 10, 1922, and October 11, 1924. None was seen in the fall of 1923.

Tringa solitaria solitaria Wilson.

Solitary Sandpiper. (8.)

Although not so many individuals of this species were noted as of the other species of sandpipers, they were found in a greater variety of situations. Usually single birds were found. They were most often found at the edge of the lake. On August 2, 1922, one was feeding along the creek above the bridge. It flew down the creek when it was disturbed. On September 4, 1922, one was feeding at the edge of a *Nelumbo* patch at the edge of the lake. One was flushed at the edge of a small opening in *Typha* on August 21, 1923. One was seen on the mud at the edge of a pool cut off from the river, near the mouth of the creek, on September 8, 1923. Two were seen at a marshy place below a spring on April 28, 1923. May 17, 1924, is the latest recorded date of occurrence in the spring.

Catoptrophorus semipalmatus semipalmatus (Gmelin).

Willet. (1.)

A male flew to the lake at five o'clock on the afternoon of August 22, 1922, and settled in water about three inches deep. The bird was shot after it had started to bathe. It permitted a close enough approach to be shot with No. 10 shot.

On May 18, 1924, a crippled willet was seen on the mud at the edge of Doniphan lake. It would not allow a close approach, but it staggered when it attempted to run or to start flight. It flew out over the water and returned to the shore several times.

Tryngites subruficollis (Vieillot).

Buff-breasted Sandpiper. (.5.)

On August 27, 1921, two birds of this species were shot out of a group of four at the edge of Doniphan lake. They were feeding farther away from the water than were the other kinds of sandpipers. Both the birds that were collected were males.

Actitis macularia (Linnæus).

Spotted Sandpiper. (18.5.)

This sandpiper fed along the creek, along the river, at the edges of pools on the bar, and among patches of *Nelumbo*. Individuals were frequently seen resting on boxes and logs in the lake. On August 23, 1921, some were seen feeding on the tops of leaves of *Nelumbo* that were floating in the lake. Spotted sandpipers were found throughout the summer, although they were more plentiful during the migration seasons. The earliest record is May 3, 1924, and the latest fall record is September 10, 1922.

Numenius americanus Bechstein.

Long-billed Curlew. (.5.)

A long-billed curlew was seen with sandpipers at the edge of Doniphan lake on May 8, 1924.

Squatarola squatarola cynosuræ Thayer and Bangs.

American Black-bellied Plover. (2.5.)

An adult came to the lake on August 21, 1922. It ran through water about two inches deep with a peculiar jerking motion. It called several times and flew away towards the river with some yellowlegs. On August 23 one was seen in about the same place. On August 28 three were feeding on the north side of the lake. About half the time they were on the shore about fifty yards from the water and the remainder of the time they were in water about three inches deep. They were very shy and it was difficult to approach them. After about three hours of stalking one was killed. The two remaining birds left in the direction of the river. Two birds were seen at the lake on August 31 which were very shy.

One was seen in water three inches deep at the edge of Doniphan lake on June 3, 1923. It did not fly far when it was disturbed, and it called only once or twice.

Oxyechus vociferus (Linnæus).

Killdeer. (16.)

The killdeer was often seen, with other waders, feeding on the mud around the lake. These birds usually kept a little farther back from the water than did the other waders. The groups of killdeer were usually not large, the largest flocks being found in the fall and being composed of about twelve birds.

Spring records for this bird are between March 15 and June 23. Fall records are between August 13 and October 30.

Charadrius semipalmatus Bonaparte.

Semipalmated Plover. (7.)

This bird was found feeding around the edges of the lake, both near the edge of the water and at a little distance back from the shore.

Dates of occurrence in the spring are between May 3, 1924, and June 7, 1923. Fall migration dates are between August 11, 1922, and September 7, 1922. This bird was not seen during the fall in other years.

Colinus virginianus virginianus (Linnæus.)

Bobwhite. (17.5.)

The bobwhite was not numerous. Never were more than one covey or one or two pairs seen in a single day, and although the bird was probably present throughout the year, none was seen in November or February.

This bird fed in weed patches and deserted fields along the sides of the hills, along the roads, and in the timber on the bluff. Sometimes it was found in the willows on the bar. In the mornings it was often heard calling along the creek or on the bar, and more frequently between May and September than at any other time.

A pair was flushed from an unfinished nest on June 10, 1922. The nest was in a heavy growth of grass on the side of a ravine on the bluff. The nest was nearly finished and opened to the south.

All of this species that were seen between the first of October and the first of May were in coveys that were made up of from eight to twenty birds. During the rest of the year individuals or pairs were seen, and these were most often noted along the roadsides.

Zenaidura macroura carolinensis (Linnæus).

Mourning Dove. (84.5.)

Several mourning doves were seen daily throughout the year except during the winter, when they were present in much smaller numbers. They fed in all parts of the area where they could find food. Most of their food was obtained from the ground or from plants that produced seeds near the ground. The mourning dove was often seen gleaning food from the roads, from barn lots, from weed patches, from pastures, from mud flats near the lake, from granaries, from fields, and from open places both on the bluff and on the bar. Mourning doves rested upon dead or leafless limbs of trees, on buildings and bridges, and on telephone wires. When moving from one place to another these birds were often seen flying high above the tops of the trees.

On April 22, 1924, a pair was seen building a nest in an Osage orange tree along a road east of the center of the area. On May 3, 1924, an adult was brooding an egg in a nest ten feet from the ground on a horizontal limb of a box elder that was in a yard.

A pair was watched that was working on a nest at eight a. m. on May 6, 1923. The nest was in a tree in a yard, and was on a horizontal limb twelve feet from the ground. The female stayed on the nest while the male made trips to the ground in the edge of an orchard about fifty feet away to get material. Each trip required from ten to sixty seconds. When returning to the nest with material the bird did not fly directly to the nest, but first stopped in some other part of the tree usually at the end of a dead limb and about ten feet from the nest. After about ten seconds it would fly to within one foot of the nest. Instead of lighting directly on the nest the bird usually settled on the back of its mate and then lowered its head, bringing the material for the nest near to and below the head of the female. The female then took the straw or sticks in her bill and arranged them in the nest. She turned after each trip so that the nest was built evenly all the way round. A few times the male laid the material directly on the nest. He always left immediately after the female took the sticks. No trace of this nest could be found on May 13.

On May 19, 1923, a pair was building a nest twelve feet from the ground in an Osage orange along a road. One bird was on the nest and one carried material. The same pair was working on this nest on the next day.

A nest containing two eggs was found in an apple tree in an or-

chard on June 7, 1923. It was twelve feet from the ground. As the brooding adult left the nest it flew low but did not touch the ground.

An adult was brooding on a nest fifteen feet from the ground in an elm tree on June 8, 1922.

A mourning dove was seen on a nest with two eggs that was on a leaning willow stump in the north part of the lake on June 19, 1922. The nest was two feet above the water and about one hundred yards from the shore. Whether or not the young were successful in reaching shore was not determined.

A partially completed nest was found nine feet from the ground on the main trunk of a redbud that was leaning at a forty-five degree angle. The tree was on the lower part of the bluff. An adult was on the nest, but it flew to a small limb near the ground and about fifteen feet away when it was approached.

An adult was brooding on a nest twenty-two feet from the ground and four feet from the end of a limb of a walnut in a yard on June 23, 1923. On June 26 another adult was found brooding on a nest forty-five feet from the ground and near the end of a branch of a honey locust that was twenty-five yards from the walnut.

A single adult was gathering material from the ground in a yard and carrying it to a limb eleven feet from the ground in a peach tree in an orchard in the morning of June 24, 1923. The same bird was carrying material and working on this nest on June 26.

A nest was found thirty feet from the ground and four feet from the end of a limb of a large elm along a road on June 30, 1923. An adult was brooding at 7:30 a. m., and another adult was perched on a limb three feet away.

On July 1, 1923, a nest was seen in a maple in a yard, which also contained nests of the blue jay and the Baltimore oriole. This nest was thirty feet from the ground, and was on a limb that was nearly forty-five degrees from the horizontal.

The latest nest record for this species is July 18, 1923, when a nest was found that was thirty feet from the ground and three feet from the main trunk of a hackberry in the E. V. Roundy yard. An adult was brooding.

These birds were often found in groups of three, especially in early fall. Larger flocks were noted in late summer, as when several small flocks were seen along a road on August 28, 1923. On August 29, 1923, some flocks were feeding in the wheat stubble on the hills north of the lake. Occasionally, during the winter, flocks numbering from twelve to fifteen were found feeding in weed patches along the edge of the bar or along the creek in sheltered places.

Cathartes aura septentrionalis Wied.

Turkey Vulture. (38.)

From one to twelve turkey vultures were seen almost daily in the summer, soaring over the bluffs or over the river valley. They were not often seen except when flying. Once one was seen resting on some drift on a sand bar in the river. At one time one was seen perched in a cottonwood tree on the bar, and on another occasion one was seen in the top of a medium sized dead tree near the top of the bluff.

On June 6, 1923, a nest was found in a hole in the top ledge of limestone of the bluff and three-fourths of a mile south of the center of the area. The hole was two feet across at the opening and was ten feet deep. Its floor sloped down at an angle of about forty-five degrees from the horizontal. The opening was shaded by small shrubs and larger trees. In the morning when the nest was found the brooding adult scrambled back to the far corner of the hole. It was too dark in the hole to distinguish objects in the nest. In the afternoon when a flashlight was used the adult refused to leave the nest. When small pieces of rock were thrown into the hole the bird moved a little, and one young bird could be seen and apparently three eggs. These may have been parts of eggs. The shells appeared to be dark brown and no spots could be seen. The young bird was white and downy. A large amount of dark brown, semi-solid food material with a very disagreeable odor was regurgitated by the brooding bird when it was disturbed.

April 5, 1924, is the earliest spring record for the turkey vulture, and September 24, 1922, is the latest fall record.

Circus hudsonius (Linnæus).

Marsh Hawk. (12.)

Usually, only one marsh hawk was seen at one time, but pairs were seen on a few occasions. The status of this bird may be shown best by a summary of its occurrence by months.

On January 24, 1923, one was chased over the river and into the willows by a crow. One was seen on each of the three days following. On February 18, 1923, two were flushed from the thick growth of small willows between the lake and the river. They flew up the river together. One was seen flying over the bar on February 5, 1924. None was seen in May. Marsh hawks were seen flying over the bar on March 3 and 31, 1923. One or two crows were seen fly-

ing at the bird seen on the latter date. April dates are 1 in 1923, and 19 and 21 in 1924. On June 13, 1922, one was flying north over the willows in the afternoon. On June 21 a female was flying low over the willows, and on June 22 one was flushed in the tall grass between the lake and the river. There are no July records. On August 10, 1922, one that was hunting around the lake scared away a small flock of sandpipers. An adult was flying over the willows near the mouth of the creek on August 14, 1922. On August 23, 1923, one, in the reddish phase, flew low over the bar near the river. There are five records for September. On September 8, 1923, one flew low over the lake and was chased by a whole flock of swallows late in the afternoon. One flew low over the willows on October 7, 1922. There are no records for either November or December.

Accipiter velox (Wilson).

Sharp-shinned Hawk. (.5.)

A sharp-shinned hawk was flushed from the ground near a marshy place at the foot of the bluff on May 12, 1923. It flew into the willows on the bar, where it stopped. Another flew over the bar on February 14, 1925.

Accipiter cooperi (Bonaparte).

Cooper's Hawk. (15.5.)

Single Cooper's hawks when seen were usually flying over the tops of the trees on the bluff, on the bar, or low over the fields. On August 25, 1921, one was shot in a tree which stood about half way to the top of the bluff.

On June 7, 1922, a female was brooding five downy young in a nest thirty feet from the ground in a red-oak tree at the side of a road on the bluff. The nest was in a fork of the main trunk of the tree, which was six inches in diameter. While the tree was being climbed the adult made three swoops to within a few feet of my head and called several times. The next day the female was seen going to the nest at six o'clock in the evening. She was seen in a near-by tree on the 10th. On June 18 an adult circled around the nest. The white, downy feathers of the young birds could be plainly seen from the ground. A male was carrying food in the direction of the nest on June 21. On June 26 the five young, whose feathers were now about half grown, were shot out of the nest. Their stomachs were filled with the remains of two chickens of a size which would probably weigh about half a pound.

A nest was found fifteen feet from the ground in an oak tree in a ravine on the Whittaker farm on June 11, 1922. It held five bluish-green eggs. They were fresh. The female was not on the nest in the morning, but was incubating at five o'clock in the evening.

A Cooper's hawk was seen flying high over the willows on January 26, 1923. One flew into the group of trees near the house on the Whittaker farm on February 3, 1924. On April 14, 1923, one, flying west over the lake, caused a small flock of yellowlegs to rise and call, but it flew on without stopping. On April 15 one was chasing a red-tailed hawk over the bluff.

Late fall dates for this bird are November 17 and 18, 1923. One that had not been dead for a long time was found on the shore of the lake on November 30, 1922.

Buteo borealis borealis (Gmelin).

Red-tailed Hawk. (32.)

In the summer not more than one or two of this species were seen in a single day, but in winter and the seasons of migration it became more numerous, and several were often seen at one time. It was most often seen flying over the bluff and the bar. Sometimes it was found resting in the tops of tall trees. On May 10, 1924, one was flying among the trees and near the ground on the bluff. On April 15, 1923, one was chased out of the timber on the bluff by a Cooper's hawk.

A red-tailed hawk flew from a nest in a tree near the top of the hill one-quarter of a mile northeast of the E. V. Roundy house on March 31, 1923. At first the bird stopped in a nearby tree and called several times; then it moved on to other trees and finally circled overhead several times; but it did not leave the vicinity. Two hours later, when it was approached, the bird left the nest directly. The nest was twenty-five feet from the ground and was in the top of an oak tree that was one foot in diameter at the base. On April 1, when the tree was climbed, the nest contained three eggs. The female stayed nearby and called while the nest was being examined. On April 7, the nest had one whole egg with a large hole in the side and one egg with a larger hole lay on the ground. No hawks were near. The material in the nest was disarranged.

On March 20, 1925, a nest was found in the timber one-quarter of a mile north of the nest that had been found in 1923. The female called from a near-by tree, but was not seen on the nest which ap-

peared to be nearly finished. Some new material was seen hanging over the edge.

A female was brooding on a nest in the top of a tree in the bottom of a ravine on the bluff on March 18, 1925. The bird left the nest and flew overhead and called when persons passed through the timber near the nest tree.

On June 4, 1923, two young of this species were seen with one adult in the timber on the bluff. The young birds were able to fly The adult was calling in the vicinity.

Some individuals of this species were seen every month in the year

Buteo lineatus lineatus (Gmelin).

Red-shouldered Hawk. (13.)

Red-shouldered hawks were more common in August and September than at other times of the year. They were seen flying over the bluff or perched in trees on the bluff or on the bar.

A female that was shot on August 16, 1922, had a small frog and parts of several large insects in its stomach. Another was taken on September 2, 1922. Its stomach was empty.

This hawk was present in other seasons of the year on May 4 and 12, 1923; July 6, 17 and 18, 1923; and November 18, 1923.

Buteo swainsoni Bonaparte.

Swainson's Hawk. (.5.)

Two Swainson's hawks soared over the bluff most of the afternoon of April 1, 1923.

Buteo platypterus (Vieillot).

Broad-winged Hawk. (8.)

The few records of this species are between April 21, 1924, and May 10, 1924, and between August 5, 1923, and September 1, 1923. It was usually found resting in trees on the bar or along the lower part of the bluff.

Archibuteo lagopus sancti-johannis (Gmelin).

Rough-legged Hawk. (1.5.)

A rough-legged hawk was watched feeding over a field. It was flying from one hundred to one hundred and fifty feet above the ground, and was frequently poising. Once it dropped straight to the ground, but rose again in a few seconds.

On October 21, 1923, one was circling high over the bar. On De-

cember 1, 1922, one was perched in the top of a tree in a small patch of timber on a hill one-half mile west of the bluff.

Haliæëtus leucocephalus leucocephalus (Linnæus).

Bald Eagle. (2.)

On January 29, 1923, crows chased a bald eagle over the bluff toward the lake where it stopped in a tree. Crows flew after one on February 17 and 18, 1923. On March 3, 1923, calling crows surrounded two that were in a tree on top of the bluff near the lake. The eagles flew short distances along the bluff, but they were always followed by the crows.

Cerchneis sparveria sparveria (Linnæus).

Sparrow Hawk. (1.5.)

An immature bird of this species was shot from the top of a small tree on the Whittaker farm on September 5, 1922. On September 10, 1923, one was seen on the telephone wires along the road two miles west of the river. On September 1, 1924, one was seen along the road one mile west of the river.

Pandion haliæëtus carolinensis (Gmelin).

Osprey. (.5.)

On August 11, 1922, one was flying high over the lake. It was moving south and towards the river.

Asio wilsonianus (Lesson).

Long-eared Owl. (.5.)

On March 30, 1924, a nest of this species was found twelve feet from the ground in a one-year-old crow's nest that was in a cottonwood on the bar. The tree was eight inches in diameter at the base. One owl was on the nest and another was in a willow about twenty feet away. When the bird on the nest was approached it stood up and, with spread wings, fluffed out its feathers. It flew off a distance of about twenty yards and called for a few minutes and then left. There were five fresh eggs in the nest.

Asio flammeus (Pontoppidan).

Short-eared Owl. (3.)

A scattered flock of about twenty short-eared owls was found south of the lake and about one-quarter of a mile from the river on December 2, 1922. At this point the grass was about eighteen inches high and the willow trees were scattered. Others were found

at the same place on January 25 and 26, 1923, and on March 3, 1923. Pellets were collected from this place and their contents examined. They contained many skulls of *Microtus ochrogaster*, *Peromyscus* spp., *Reithrodontomys megalotis dychei*, *Mus musculus musculus*, *Cryptotis parva*, *Blarina brevicauda*, one *Cardinalis cardinalis cardinalis*, some *Agelaius phœniceus*, and some small Fringillidæ.

Strix varia varia Barton.

Barred Owl. (2.)

A barred owl was flushed from a tree on the lower part of the bluff northwest of the lake on October 21, 1923. It flew across a small clearing and stopped in a cottonwood on the bar, where it was watched for about fifteen minutes. About an hour later the bird was again flushed from a tree on the lower part of the bluff. One was flushed from near this place on November 4, 1923. It flew north along the lower part of the bluff. The crows found the owl a few seconds after it moved and they began coming and calling.

Cryptoglaux acadica acadica (Gmelin).

Saw-whet Owl. (.5.)

A female saw-whet owl was shot on March 30, 1923. It was sitting on a small branch of a willow and was close to and on the southeast side of the main trunk. The branch was four feet from the ground. The tree was twenty-five yards from the lower edge of the bluff and on the bar. The bird was shot at four o'clock in the afternoon, and its stomach contained the remains of a mouse.

Otus asio asio (Linnæus).

Screech Owl. (23.)

The screech owl was present throughout the year, and was frequently heard calling at night.

One in the gray color phase was killed in the E. V. Roundy barn in January, 1924. Another gray one was seen at a hole, ten feet from the ground, in a small tree below the road on the bluff. A group of smaller birds, that were calling, surrounded it. One was found in an old house northwest of the lake on April 14, 1923. Scattered pellets on the floor showed that the bird had been using the roost for several days. On April 22, 1924, one was flushed from a clump of roots under an overhanging creek bank. Several, which probably made up a family group, called and flew about in a yard on May 10, 1924. There were several holes in trees in the yard

that probably would have been suitable nesting places for this species. On May 13, 1923, one was found perched on a leafy branch in the top of a large elm tree along a road. On May 19, one week later, one was seen on the same branch. On the afternoon of June 15, 1923, one was flushed from the center of a thicket of dogwood and grapevine along the lower edge of the bluff. On August 27, 1923, one was flushed from the top of a tree along the lower part of the bluff.

Bubo virginianus virginianus (Gmelin).

Great Horned Owl. (2.)

Although this bird should have been found, and it probably was present throughout the year, there are records for its occurrence in only seven months. A great horned owl was found sitting in an open nest, with eggs, in the spring of 1922, by Mr. Charles Regnary The bird was shot.

Coccyzus americanus americanus (Linnæus).

Yellow-billed Cuckoo. (62.5.)

The yellow-billed cuckoo, although a very common summer resident in this locality, was not seen in as large numbers as some other birds that were not so common. It is shy and solitary, and was more often heard calling than it was seen. It fed in the tops of the trees along the bluff, along the creek, and in the willows on the bar. A large number of nests was found, and accounts of some are given here to show the range in the nesting habits of this bird in this locality.

The earliest nest that was found was not complete on June 9, 1922.

On June 12, 1923, a nest was found, ten feet from the ground, on a horizontal limb of an elm tree on the lower part of the bluff near the mouth of the creek. It contained two eggs. Ten yards farther south there was another nest with two eggs, which was ten feet from the ground and in a redbud tree. This nest was more bulky than the other. An adult carried a dead leaf to the nest in the redbud. Both nests were partly shaded by larger trees. On the thirteenth the nest in the elm tree contained broken shells and there was no bird on the other nest. On this date an adult was found sitting on a nest, seven feet from the ground, in a grapevine that was growing over a horizontal limb of a small partly dead elm tree at the lower edge of the bluff. The bird left the nest, which contained two eggs, when it was approached to within ten feet.

On June 16, 1922, a nest was found, four feet from the water, in

a fork of a willow among the stumps in the north part of the lake. No bird was on the nest, which contained three eggs.

An adult was flushed from a nest, with three eggs, that was seven feet from the ground in a leaning pawpaw on the side of the bluff on June 25, 1923. The bird flew to the ground when the tree was shaken.

A nest was found on June 27, 1923, which was on a horizontal fork of a lower limb of a walnut and seven feet from the ground. The tree was near the top of the bluff northwest of the lake and was ten yards from the edge of the timber. In the nest were three young birds with black quills, and one egg. An adult came about one minute after the nest was found, but after seeing an intruder, it stayed in a tree about fifty feet away and called.

On June 29, 1923, a nest was found that was six feet from the ground in a rose bush that was growing over a small walnut near the top of the bluff. An adult was brooding four eggs. When disturbed it flew to a tree fifteen feet away, and then, drooping and shaking its wings as if they were broken, it flew on farther.

On June 30, 1923, a nest was found in a box elder along a road by a cornfield. The nest was eight and one-half feet from the ground, in twigs near a horizontal limb one inch in diameter. An adult that was brooding three eggs left when the limb was shaken. Another adult that was in the tree also, left when the tree was approached to within thirty feet. On the same date a nest was found eight and one-half feet from the ground in an Osage orange tree along a road. The nest was a little to one side of a horizontal limb and was partly shaded. An adult that was brooding four eggs flew off slowly when an intruder stood near the nest.

On July 3, 1923, a nest was found five feet from the ground in an oak sprout along a road. The nest contained one egg and two young birds with black quills. The brooding adult left when it was approached to within three feet. One of the young birds opened its mouth for food. On July 9 this nest was empty and its floor was covered with scales from the young birds. Another nest was found on July 3 that was in a dogwood one hundred yards north of this one. It was five feet from the ground and contained two eggs. No bird was near. On July 9 there were four eggs but no bird was seen.

On July 14, 1923, a nest was found, four feet from the ground in a redbud six feet high, in a sprout field southeast of the lake. The nest was made of sticks and held four eggs. An adult was brooding. The sprout was surrounded by a thick growth of vegetation.

A nest five and one-half feet from the ground in a grapevine that was running over an ironwood, was found on July 15, 1923. There were five eggs in the nest. The sitting bird left when the vine was touched.

On July 18, 1923, a nest was found, four and one-half feet from the ground, in sumac in a hog pasture which was on top of a hill. An adult was on the nest which held two eggs and three young, one of which had its eyes open, one had its eyes partly opened, and one had its eyes shut. This nest was two inches deep on the outside.

A nest was found seven feet from the ground in a small willow, between the creek and a cornfield, on the bar. The nest had three eggs. The sitting adult left when approached to within fifteen feet.

An adult was sitting closely on two eggs in a nest, six feet from the ground, that was found in a rough-leaved dogwood on the bluff on August 28, 1922. On September 2 there were young in the nest. The parent stayed on the nest until it was touched, and then flew only a short distance. It appeared to be not excited. The adult was on the nest on September 6. On September 10 the nest was empty.

On September 9, 1923, an adult was brooding on a nest in the top of a medium-sized oak tree on the bluff. The nest was twenty feet from the ground.

In all, thirty nests of this species were found in the two seasons.

During the migrations, especially in the fall, this cuckoo was frequently found feeding with groups of the smaller transients. This bird was late in arriving in the spring, and was not seen before May 19 in 1923, and May 17 in 1924. In the fall the last one was seen on October 12, 1924.

Coccyzus erythrophthalmus (Wilson).

Black-billed Cuckoo. (3.)

On May 19, 1923, a black-billed cuckoo was shot from the top of a small tree on the lower part of the bluff. One was seen near the ground in the willows on June 7 and one on June 10, 1923. On June 23, 1923, one was seen along the lower part of the bluff that was carrying something in its mouth. On August 23, 1923, one was seen resting in the top of a small tree on the lower part of the bluff near the lake. It flew low over the bar about fifteen minutes later. On September 4, 1924, one was shot on the lower part of the bluff near the lake. It had part of a cicada in its mouth.

Ceryle alcyon alcyon Linnæus).

Belted Kingfisher. (25.)

Rarely were more than one or two kingfishers seen in a single day. This species was often seen feeding at the lake, along the creek, and at pools, on the bar, below springs. Its rattling cry could usually be heard as it flew up or down the creek. On April 20, 1924, one called and stopped in a tree along the creek, where there were some holes in the bank in which it might nest.

One was seen on March 30, 1923, and one on March 29, 1924. There is a record for March 21, 1925. The latest fall record is October 8, 1922.

Dryobates villosus villosus (Linnæus).

Hairy Woodpecker. (39.5.)

From one or two to half a dozen hairy woodpeckers were seen on each day that the species was observed. In the summer months they fed in the trees on the bluff, along the creek, and on the bar. During the winter months a good share of this bird's time was spent in weed patches with small seed-eating birds, where it obtained food in addition to that which it got from the trees and the tree trunks in the timber.

Two birds were making trips with food to a tree in the creek bottom on April 29, 1923. They took turns going into the hole, which was twenty feet from the ground and on the southwest side of the tree trunk. Once one waited for the arrival of the other before leaving, but usually each was in the hole for a short time only, and one did not wait for the return of the other. They made trips from 11:30 until noon.

One was feeding in a shed near the creek on February 5, 1924.

Dryobates pubescens medianus (Swainson).

Downy Woodpecker. (89.)

Several of these woodpeckers were seen almost every day that records were kept. They fed over the whole area where there was enough vegetation to insure a food supply. In the fall and winter they were nearly always prominent in the small flocks of birds that moved through the timber and the weed patches in search of food. The call note of this bird and the sound which it made in picking for food was always an indicator that a feeding flock of birds was near.

On January 28, 1923, one was seen going to roost in a hole in a

tree, growing in a yard, at five o'clock in the afternoon. It flew out after the limb was struck several times with a gas pipe.

One was digging a hole in a large elm at the side of a road on May 4, 1924. On May 12, 1924, a pair was seen on a dead willow along the creek. The female was working on a nest, twenty-five feet from the ground and on the southeast side of the trunk. The male approached the female, and both flew to a near-by tree where mating took place, and the female returned to work at the nest. On May 19 one of the pair entered the nest three times within half an hour.

Young birds called loudly in a nest, eight feet from the ground in an apple tree, in an orchard on June 3, 1923. An adult was seen carrying food to them. On June 4 a bird flew out of a hole in an apple tree thirty-six steps away from this nest. On this date a nest was found in a dead stump in the bottom of a ravine which contained young. The nest hole was fifteen feet from the ground. Both parents came and called very nervously in the vicinity.

A nest was found on June 7, 1923, that was seven feet from the ground in a willow stump on the north side of the lake. Young birds inside the stump called loudly, and the parents called excitedly from near-by stumps. The young were still in the nest on June 12.

A group, probably made up of the birds of one family, was found feeding along the bluff as early as June 26, 1923.

Sphyrapicus varius varius (Linnæus).

Yellow-bellied Sapsucker. (.5.)

One that was watched, that was feeding on a tree trunk on the bluff on March 18, 1925, flew after other birds, especially woodpeckers, that came near.

Melanerpes erythrocephalus (Linnæus).

Red-headed Woodpecker. (65.5.)

Red-headed woodpeckers were more restricted in their local distribution than were the other species of woodpeckers, and so they were present in fewer numbers than were the other species. In summer they were found feeding in the larger, leafy and dead or dying trees. In winter the few that were present lived chiefly on acorns, which were produced in abundance in this area. One that was killed on the Whittaker farm on October 24, 1924, was carrying acorns. These woodpeckers were often found in the large dead trees at the edges of openings in the timber. These trees were used as perches

from which the birds made short flights into the air to catch flying insects. One was seen taking corn from a crib on July 1, 1923. This species was commonly found on telephone poles along the roads.

An adult was flushed from a hole in a dead tree along a road on June 6, 1923. On June 8 a pair was feeding young birds in a hole in another tree. The parents were feeding young in this nest on June 28 and 30. On July 9 they were feeding their young in a tree across the road from the nest. On July 11 these young were seen as far as two hundred yards from the nest tree. On August 21, 1922, an adult was feeding young in a nest twenty-five feet from the ground in a dead tree along a road.

The regular summer residents were present between March 21 and September 24. Dates of winter occurrence are January 24 and February 17, 1923, and October 25, 1924.

Centurus carolinus (Linnæus.)

Red-bellied Woodpecker. (65.)

This woodpecker was found in small numbers almost daily throughout the year. It was most often seen in the timber along the bluff near the creek. Yards and orchards were frequented regularly. Although most of the feeding was done in these places, the bird was seen a few times feeding in other situations. On June 8, 1923, a pair was seen gathering food from the ground in a road. On February 7, 1924, one was eating corn at a crib in a yard. One flew into a mulberry tree along the bluff on July 7, 1923, and picked off two ripe berries which it ate. It picked one of the berries while on the wing. One was feeding on dogwood berries on the lower part of the bluff on September 8, 1923.

A red-bellied woodpecker was calling, in a hole twelve feet from the ground, in a willow stump along the creek on April 21, 1924. It left when the stump was hit. On April 29, 1923, one flew to a hole in the top of a tall, dead stump on the north side of the creek. Another bird left, and for about ten minutes the arrival stayed on the side of the stump. Then it went inside and stayed, with its head out, for about ten minutes. On May 12 an adult came and entered this hole. After a few minutes another came, and the first bird left. It returned after about five minutes, and after it stuck its head into the hole the other bird left. This bird entered and remained for as long as the hole was watched—about fifteen minutes. On May 19, 1923, a parent was feeding young birds at this nest. It entered the nest hole with food three times within eight minutes. On each trip

it went in a different direction to get the food. An adult was seen carrying food to this nest on June 3, 1923, and on June 8.

A parent was feeding young in a hole in a living elm in a ravine along the bluff on June 15, 1922. A family of young, just out of the nest, was being fed near there on June 21.

Parents were seen feeding young, just able to fly, on June 6, 1922, and on June 25, 1923. The last mentioned family was seen in an orchard, and was composed of birds which were able to fly, but that had trouble in getting a foothold on the limbs on which they alighted.

A red-headed woodpecker was observed to chase a red-bellied woodpecker out of a large dead tree along a road on September 4, 1923.

Colaptes auratus luteus Bangs.

Northern Flicker. (38.)

The northern flicker was present in small numbers, but it was not so numerous as to be found daily. Individuals were found feeding in the timber along the bluff, on the bar, along the creek, and in yards. A few times it was seen on the ground or on dead stumps. On September 4, 1923, one was seen going to roost in the side of a building where there was a hole, in Doniphan. The loud call note of this bird was often heard on the bluff.

One flew out of a hole, thirty feet from the ground, in a dead stump at the edge of the lake on June 10, 1923. On June 12 a bird flew out of the same stump when the base was hit with a stick. This stump was blown into the water by a storm on June 27.

Although this species was present throughout the year, it was found in greater numbers during the seasons of migration than at other times. Flocks were seen moving south in the fall. A flock of over a dozen birds was in the Roundy yard at six o'clock in the morning of September 24, 1922. On October 7, 1922, a large flock was moving in a loose formation down the river. They stopped in the cottonwoods and other trees as they moved. A flock was scattered in the tops of the trees and slowly moving south on the lower part of the bluff on October 11, 1924. On February 17, 1923, a flock of fifteen or twenty was feeding half way to the top of the bluff.

Antrostomus vociferus vociferus (Wilson).

Whippoorwill. (46.)

Birds of this species were heard calling in the timber at night during the summer. Once, May 3, 1924, one was heard calling in the daytime. This was at nine in the morning. Occasionally one or

two were flushed from the ground in thick growths on the bluff. On August 26, 1921, one was shot out of a tree on the side of the bluff. It was perched crosswise on the limb which was twenty-five feet from the ground.

On June 16, 1923, two eggshells were found on the ground among growths of dogwood on the bar north of the lake.

A whippoorwill was flushed from one egg, on the ground twenty-five yards from the edge of the timber on the bluff west of the lake, on June 14, 1923. The bird flew about thirty feet and settled on the ground. Then it flew on a few feet and stopped on a limb of brush and perched, with its body parallel to the limb. It then flew in a circle toward the edge of the timber. The timber at this place was rather open underneath, there being few weeds or saplings. Elm, walnut and oak trees were growing near by. The egg was light with a few splotches. On June 21 there were two eggs. On this date the adult fluttered away when approached, moving only about two feet at a time and acting as if its wings were broken. An adult was sitting on the eggs on June 28. It flew off and went to a small piece of brush about ten yards away where it sat with dropping wings. The eggs were being incubated on July 3, nineteen days after the first one was found, but on July 6 a diligent search showed no traces of either eggs or young.

April 18, 1924, was the earliest date on which this species was heard calling, and September 10, 1923, is the latest date on which it was heard in the fall.

Chordeiles virginianus virginianus (Gmelin).

Nighthawk. (7.)

Nighthawks were found only during migrations. They were nearly always found in flocks that flew in a southwesterly direction over the lake, and fed as they moved over the water in the fall flight. Even when not flying over the lake they usually moved in the same direction, *i. e.*, southwest. In the afternoon of August 27, 1921, one was shot from a horizontal limb in a large tree in a yard. Most of the flying birds were seen in the evening or late afternoon.

The only record for spring is May 17, 1924, when one bird was seen. Fall records are between August 23 and September 23.

Chætura pelagica (Linnæus).

Chimney Swift. (59.)

Chimney swifts were seen flying over the tops of the trees on the bluff and on the bar, over the lake, and over groups of farm build-

ings. Only a small number was present except during the time of migration.

Young birds, nearly ready to leave the nest, were seen in a nest in a chimney in the E. V. Roundy house on July 18, 1923. The nest was eight feet below the top of the chimney. Adults were flying overhead.

April 22, 1924, is the earliest date of occurrence in the spring, and October 11, 1924, is the latest fall record.

Archilochus colubris (Linnæus).

Ruby-throated Humming Bird. 45.5.)

Humming birds were not conspicuous, and so they were not seen every day. The species became very common in late summer and during the early fall migrations. In summer this species fed at flowers in gardens and on the bluff. In the late part of the season individuals extended the territory over which they ranged, and were found often in fields and on the bar. In August and early September they spent a great part of their time on the bar, feeding at the jewelweed which blooms at that season. A part of their time was spent resting on dead limbs and flying after one another. On August 14, 1922, one was seen flying through a cornfield. One was hovering at the end of a water pipe at a spring and drinking water on September 6, 1922. Birds of this species were usually found alone, the largest group found together at one time being three. This group was seen feeding in the willows on August 10, 1922.

The short, squeaky call note of this bird was heard several times.

All the humming bird's nests that were located, except one, were on the bluff. That nest was in the creek-bottom timber.

On June 10, 1922, a nest was found saddled on a horizontal twig three-eighths of an inch in diameter at the end of a branch of a large oak tree at the side of a road. The nest was twelve feet from the ground. A female spent most of an hour on near-by twigs. On June 17 the nest was empty. On June 24 the female was sitting on the nest. On June 26 no bird was in sight and the nest, which contained two eggs, was removed by cutting the twig which supported it. On August 5 a nest was found on another twig which was two feet away from the location of the one found first. The second nest appeared to be smaller than the first one had been. No bird was near.

On June 4, 1923, a female was building a nest fifteen feet from the ground in an ironwood tree in the timber along the creek. The

limb which held the nest was three-fourths of an inch in diameter. The nest was found at 2:30 p. m. The bird worked until 2:40 p. m., when it stopped and was not again seen until 3, when it resumed nest building. From twenty seconds to two minutes were required for each trip to gather material, and about twenty seconds were spent at the nest on each trip. The bird, with the new material to be added, stood at the edge of the nest and added the material to the outside of the wall and to the limb, drawing the bill from one side to the other in the process. At least a part of the nest material was gathered from trees while the bird was on the wing.

On June 18, 1923, a nest was being built twenty feet from the ground on a branch of a hickory tree that was one-fourth inch in diameter. The nest was eight feet from the main trunk. The tree was on the top shelf of the bluff. After bringing coarse material for three trips, and placing it on top and at the edge of the nest, the bird brought some finer material which it drew from the limb over the outside of and toward the edge of the nest. Then it brought more coarse material. There were a few rest periods which the bird spent on near by dead twigs. The material was gathered from near the ground and while the bird was on the wing. Another nest was found, twenty-five feet from the ground, in an oak tree on the side of the bluff on that day. A female visited it once while it was being watched.

An adult was seen brooding on a nest on a horizontal limb of an oak tree on the side of the bluff. The nest was eighteen feet from the ground and on a branch which was three-eighths of an inch in diameter. The female left the nest once to fly after a tufted titmouse that came near.

A nest was found, saddled on a triple horizontal fork of a hickory tree on the side of the bluff on July 2, 1923. A bird went to the nest once, then left and after sitting on a dead limb for a few minutes, it returned to the nest and began brooding. One brooding adult left its nest several times to chase a Kentucky warbler from the tree which held the nest.

On July 14, 1923, a nest was found twelve feet from the ground and two feet from the end of a limb of an oak tree on the bluff west of the lake. The female left the nest when it was approached, but stayed in the vicinity for several minutes.

The season of summer residence of the ruby-throated humming bird extended from May 19 until September 15, 1923. In 1922 the last bird seen was noted on September 7.

Tyrannus tyrannus (Linnæus).

Kingbird. (44.5.)

A few kingbirds were present all summer on the ground studied, but the species was much more common during the seasons of migrations. In summer this bird was found along roads, in trees at the edge of timber on the bluff, in yards, and along creeks. It fed most often in places where flying insects were abundant. On August 18, 1923, seven were feeding from the top of a dead tree at the edge of a cornfield. They singly made trips, some of them more than one hundred yards in length, over the cornfield, where they caught insects. In the latter part of August and first of September, 1923, a flock stayed in the dogwood trees along the lower part of one portion of the bluff. Here the birds fed on the ripened berries. During the fall season of migration this bird was seen daily in trees and bushes along the river, creek and lake. From these perches the birds flew out over the water to catch insects.

Kingbirds were found occasionally on telephone wires along the roads and on wire fences. On May 17, 1924 one was making feeding trips from a dead stick in a patch of *Typha* in the lake. On August 30, 1923, several were flying over the lake. They settled in the thick growth of weeds in the water. On May 8, 1924, two flocks of about ten each were seen in a field along a road.

The kingbird did not commonly nest within the limits of the area studied, but a few nests were located near by where conditions were similar to those within the area. On June 17, 1922, a nest was found twelve feet from the ground in an apple tree on the Whittaker farm. Here one adult was brooding two eggs and one was perched on the top of the tree. On June 23, 1923, two nests were found, each about twelve feet from the ground, in sycamore trees at the edge of Doniphan lake. One was on a horizontal limb and was eight feet from the main trunk, and one was in a crotch formed by a branch and the main trunk.

May 6, 1923, is the earliest spring record for this species and September 10, 1923, is the latest date of occurrence in the fall. The latest record in 1922, is September 10.

Myiarchus crinitus (Linnæus).

Crested Flycatcher. (37.5.)

A few pairs of crested flycatchers nested in the timber along the bluff each summer. They fed along the bluff, in the willows on the

bar, and in the timber along the creek. They were frequently found perched in the tops of dead trees.

Although there is no actual nesting record, there is some evidence that these birds nested in holes in trees on the bluff. On June 13, 1923, a pair was watched at a stump in which there was a hole. Each in turn called and, with rapidly moving wings, hovered before the other.

The period of summer residence of this bird extended from April 29 to September 15 in 1923. In 1923 it was not found after September 4. Crested flycatchers were present in small numbers in the flocks of small transients, which fed together in the early part of the fall migrations.

Sayornis phœbe (Latham).

Phœbe. (31.)

The phœbe is rather restrictive in its choice of habitat. As there were not suitable locations for a large number, only a few pairs remained to nest in this area. These stayed in the vicinity of buildings, especially those that were not used a great deal, bridges, and a few cut banks that were suitable. Near these places, the birds perched on dead branches or other supports and waited for suitable insect food to come near.

On April 15, 1923, a pair was building a nest on top of a stringer in a hog shed. Only one bird brought material to the nest. It gathered sticks from the ground and carried them into the shed from different directions. This bird's mate stayed within one hundred yards of the nest. After four or five trips to the nest the bird flew to a near-by box elder tree to feed. It hovered near, and picked off insects from the twigs and buds. The air was too cool for many flying insects, the temperature being forty degrees. An adult was on the nest on April 28 and on May 13. On May 19 the nest was empty. A nest in this shed in the 1924 season had four eggs on May 11. A bird was near, but none was on the nest.

A nest was found four feet from the ground on a wall of rock along the creek on April 22, 1924. It contained five eggs. The rock projected out over the nest.

On April 28, 1923, a nest was found on the side of a vertical bank of loess along the creek. The lower part of the nest was composed chiefly of mud, and it was lined with moss. There were three eggs. This nest was on a level with and was five feet away from one in a similar position that had been built and used during the previous season. On May 12 there were four eggs in the 1923 nest.

A nest with three eggs was found in an old deserted house on June 5, 1923. No birds were near. A bird was brooding on June 13. On June 27 the nest was empty.

A phœbe was catching insects at a small pool in a ravine on July 10, 1923. The insects were on the surface of the pool. This was one of the hottest days of the season.

A small flock was perched in the willows, where they were catching insects over the water, in the northeast part of the lake, on August 23, 1922.

During the migrations this bird was often seen, in the tops of trees along the bluff, in flocks of other migrating birds. It was most numerous in those situations during the last part of August.

In 1923 this bird was first seen on March 30. In 1924 the earliest record is March 29. The first was seen in 1925 on March 19. The latest fall record is September 24, 1922.

Nuttallornis borealis (Swainson).

Olive-sided Flycatcher. (2.)

This flycatcher was found on only four days, all of which were in the fall. On August 27, 1921, one was shot out of the top of a tree on the side of the bluff. Its loud call attracted attention to the bird. On September 3, 1924, one of two young birds was shot in the top of a large dead tree in a yard. One was feeding from the top of a dead tree along a road on the bluff on September 8, 1923, and one was seen in the same kind of a location on September 11, 1923.

Myiochanes virens (Linnæus).

Wood Pewee. (47.5.)

A few individuals of the wood pewee were seen daily in the summer. They were distributed uniformly through the timber on the bluff and along the creek. They were usually seen in the tops of the larger trees. The locations of individuals of this species were most easily determined by hearing their distinctive call note.

On June 21, 1922, a nest was found on a fork of a horizontal limb of an oak tree and twenty feet from the ground. One bird was perched in the top of the tree. Another flew out from the nest, and the two flew after a blue jay and chased it from the vicinity of the nest.

A nest was found on June 25, 1923, which was near the end of a limb of a large sycamore at the edge of the bar. The nest was

twenty-two feet from the ground. An adult that was on the nest left and flew to a near-by cottonwood on the bar. An adult was brooding on this nest on June 30.

A wood pewee chased a blue jay away from an oak tree on the bluff in which there was a nest twenty feet from the ground on June 28, 1923.

Adults of this species were heard calling in a sycamore tree in which there was a nest thirty feet from the ground and on a limb one-half inch in diameter which sloped upward, making an angle of more than forty-five degrees with the horizontal. The nest was fifteen feet from the main trunk and four feet from the end of the limb. It was partially shaded. No other trees were growing near the nest tree. There were downy young in the nest.

The latest record for 1922 is August 30. None were seen after August 27 in 1923. In 1923 the first was found on May 19. The first 1924 record is May 18.

Empidonax virescens (Vieillot).

Acadian Flycatcher. (5.)

A few pairs of this species were summer residents of the area. They were found on the lower parts of the bluff and in the ravines.

A nest was found along the lower edge of the bluff on June 14, 1922. It was hanging near the end of a branch of an elder and was five feet from the ground. There were three eggs in the nest. In the lower part of the nest, covered with some of the nest material, there was an egg of the cowbird. The eggs and the female were taken on June 15. The eggs were slightly incubated.

On June 26, 1923, a nest was found hanging in the end of a branch of an oak and six feet from the ground. The tree was on the side of a ravine, and was twenty yards from the edge of the timber near the top of the bluff. The nest was two feet from the end of the limb and fifteen feet from the main trunk of the tree. It was made almost entirely of the dried staminate flowers of oak. Some of these hung by the ends and gave the nest a ragged appearance. There were two young in the nest covered with white down. Each had feather tracts and their eyes were not yet open. One adult was brooding and another was calling from near by. The bird on the nest left when it was approached to within ten feet.

The only record for the migration season is August 29, 1922, when one was taken on the side of the bluff.

Empidonax trailli alnorum Brewster.

Alder Flycatcher. (4.5.)

One was found in the willows north of Doniphan lake on June 7, 1921. Dates on which this bird was taken are August 22, 1921; August 25, 1922; August 21, 1921; August 31, 1922; September 1, 9 and 10, 1922; April 28, 1923; and May 19, 1923. It was usually found with other small transients in willows and the smaller trees on the bar.

Empidonax minimus. (W. H. & S. F. Baird).

Least Flycatcher. (8.5.)

The least flycatcher was a fairly common transient. It was found with other small birds on the lower part of the bluff, along the creek, and on the bar. It was usually feeding or calling near the ground. Several collected. The records are between April 28 and May 20, 1923, and May 8 and 17, 1924. Fall records are between August 23 and September 4, 1922.

Otocoris alpestris praticola Henshaw.

Prairie Horned Lark. (2.)

The prairie horned lark is a resident on the cleared portions of the hills which are back away from the river. It was rarely found within the bounds of the area studied. On April 8, 1923, Mr. Frank Whittaker reported that he had found a nest with five eggs the previous week. It was on the ground in a wheat field on his farm. His description of the nest, eggs and bird agreed with that of this species. The location and the season make it almost certain that he found the nest of this species.

Two were seen along a road on June 22, 1922.

Pica pica hudsonia (Sabine).

Magpie. (.5.)

A magpie was killed on the Whittaker farm in January of 1922. The bird was mounted and is the property of a man named Byer who lives in Troy, Kan. For several days before the bird was killed it was seen with flocks of crows flying up and down creeks on the farm.

Cyanocitta cristata cristata (Linnæus).

Blue Jay. (93.5.)

Several blue jays were seen daily throughout the year, but they were much more conspicuous and more easy to locate in the winter. In the summer they were found scattered over the bluffs and along

the creeks wherever there was timber, and occasionally one or two were seen in the willows on the bar. This species was often seen in the trees around houses and farm buildings. During the winter it was found along the bluff and the creek, where it fed on or near the ground most of the time. Individuals were often seen high in the air flying from one part of the area to another. The loud call of this bird was heard for long distances over the bluff and across the valley.

Although a few pairs nested on the bluff away from houses, all the nests that were found were in large trees in yards or very near farm buildings. The nests were much closer together near the buildings than they could have been in other parts of the area, according to the number of pairs that were resident in the whole area. It is evident that these birds made a definite choice for those suitable nesting sites that were near a human habitation.

On April 20, 1924, a pair was building a nest twenty feet from the ground in a maple tree in a yard near a farmhouse. One of the pair brought material and gave it to the other, and that bird placed it on the nest. On the same day another bird carried material to a nest on a horizontal limb of a large elm along a road. This nest was twenty-five feet from the ground. On May 8 two more nests were located in the yard in which the first mentioned was found. An adult was working on a nest in a large maple and twenty-five feet from the ground. An adult was brooding on the other nest, which was also twenty-five feet from the ground, and which was in an elm tree. On May 17 another adult was brooding in another elm close by along a road. This nest was thirty feet from the ground, and was on a limb which sloped upward at an angle of forty-five degrees from the horizontal. All five of these nests were within one hundred yards of one point, and all were occupied at one time.

A blue jay was carrying straw to a large elm on April 28, 1923.

A nest was seen in the yard, mentioned above, on June 3, 1923. It was twelve feet from the ground on a limb of an elm that sloped up at an angle of sixty degrees from the horizontal. The tree was within fifteen feet of a house. No birds were seen near. An adult was on the nest on June 4. On June 5 at 1 p. m. a bird brought food to the one on the nest and then left. A blue jay chased a robin out of this tree on June 15. That was the third time that that pair of blue jays had been known to clash with robins in that season. The parents were feeding young in this nest on June 22. Three young were seen in the nest on July 3. The wing feathers of one were pro-

jecting one-fourth inch beyond the sheaths. The feathers of another were still in their sheaths. Two of the young opened their mouths for food when they were disturbed. The backs of the young were covered with a dark-colored down. The nest was made of sticks and was lined with rootlets. After a few minutes one of the parents came and called excitedly. On July 8 the young birds called loudly while they were being fed. More than one was fed at each trip of a parent to the nest. On July 9 the young were seen standing in the nest and exercising their wings. On July 10 the young crawled out on a limb at least a foot away from the nest. Just after a rain on July 11 the birds crawled out of the nest and were flapping their wings. A large pilot snake was seen crawling up the tree. After an attempt to knock the snake out of the tree with rocks failed, a trip was made into the tree after it, but it had already reached the nest and had the head of one of the young birds in its mouth. The bird cried out two or three times. After it was pried out of the snake's mouth it fell to the ground dead. When the snake was dropped to the ground it at first started to crawl toward the dead young bird but it later changed its course and crawled rapidly away. One of the remaining young birds fell out of the nest half an hour later. After it was dried it was thrown into the tree where it clung to one of the branches. Later, it crawled along the limb, but it finally fell to the ground and hopped away into the weeds near by. Neither parent was near the nest all this time. All the young were thoroughly wet after the rain. The remaining young bird was seen in the tree and near the nest on the morning of July 12. The parents were present in the morning, but the nest was empty in the afternoon, and no trace of the family was seen afterward.

On June 14, 1923, a nest was found thirty feet from the ground in a maple tree that was thirty-six steps away from the tree in which the last-described nest was located and which was in the same yard. An adult was calling excitedly, and a young bird just out of the nest was perched on a small limb of the tree and about five feet from the ground. The tail of the young bird had not yet grown out. Its color was lighter than that of the adult.

A nest was found in a box-elder tree in the above mentioned yard on June 16, 1922.

The earliest indication of flocking of birds of this species was noticed on July 13, 1923, when a group of four was flying together down the creek valley. Two of the group stopped in the tops of a large tree and began calling, while the other two kept on their way.

On July 14 a larger flock was calling loudly from the trees along the creek. Small flocks were found in the spring until about the first of April, when they began to break up into pairs for the coming nesting season.

This was one of the most quarrelsome species of bird in the area, and it was often either attacking other species or being the object of attack. The robin, wood pewee, blue-gray gnatcatcher, red-eyed vireo, and some other species showed at various times a tendency to be unfriendly with the blue jay.

Corvus brachyrhynchos brachyrhynchos Brehm.

Crow. (98.5.)

The crow is one of the dominant birds of the area. Some individuals were found almost every day during the work. The number present varied from a few scattered pairs to flocks of several thousand, according to the time of year. This was one of the most conspicuous species present, and its presence could nearly always be determined with a few minutes' observation.

Crows fed on the bluff, in fields, on the bar, on newly-formed sand bars in the river, and at the lake. Especially in the winter large flocks were to be found at all times of the day in some part of the lake or perched in the near-by trees on the bar. The birds walked on the mud at the edge of the water, and when the water was low or was frozen they scattered over the lake and picked up various kinds of plant and animal food.

On March 30, 1923, one was seen flying over the lake. It paused in the center and stopped in the shallow water. It then moved a short distance and picked up an object from the water which it carried to the shore and began eating. The bird was driven from its meal, which upon investigation proved to be a gar pike (*Lepidosteus platystomus*) about eight inches long. Another crow picked up some small object in the water, which it carried to the shore and began eating in the same way. Two other attempts to catch fish, that were made by crows flying across the lake, were failures.

The large crop of *Nelumbo* seeds that was produced each year furnished an easily obtainable food supply for the flocks of wintering crows. The stalks which bore the ripened seeds did not usually fall below the surface of the shallow water in which the plant grew, and it was easy for a crow to pull off one of the heads full of seeds and carry it to some place on the shore to pick them out to be eaten. Sometimes the seeds were not carried away to be eaten, but they

were pulled out of the heads, cracked and eaten where they were found. Empty shells of the seeds of this plant and empty heads were found scattered over the bar and the bluff near the lake. From the first of December until the first of April this plant furnished one of the important sources of food for the wintering crows. Of course, several other kinds of food were available at the lake and near by on the bluff and on the bar, but they were usually present in lesser abundance.

On January 27, 1923, a large flock of crows was feeding in a burned-over field. Another flock was feeding on the ground in the willows near the lake, where the leaves and weeds had been burned. On January 28, 1923, a crow was feeding on a rabbit that had been used to bait a trap.

About two hundred crows were feeding all day of March 30, 1923, on a ten-acre cleared field on the bar that was being plowed. The field was being plowed in one "land" from the outside to the center. The feeding crows were watched when three-fourths of the field had been plowed. They were scattered entirely around the field and were chiefly on the inside furrow, or the one that had been plowed last. Those birds in front of the plow moved ahead and those behind kept close, so that practically all the exposed dirt was searched over by the feeding birds. In one trip of rapid walking around one of the open furrows thirteen white grubs, three beetles (*Lachnosterna*), one pupa of a beetle, and another kind of insect larva, were picked up, and a like number of earthworms was seen. This was probably very much less than the amount eaten by the crows in each furrow. The total amount of animal life eaten in this field in a day must have been large. The birds were continually arriving and leaving, but the number feeding did not change greatly. The near-freezing temperature might have killed the grubs if the crows had not been present. These birds were much more tame in this field than in other parts of the bar.

A stomach of a crow that was shot on January 26, 1923, contained one part insects (Hemiptera) and thirty-three parts corn. The stomach of one shot on January 27, 1923, contained eight parts corn, one part insects, and a few spiders. One that was collected on January 28, 1923, had in its stomach the equivalent of six grains of corn and one grain of wheat. At the time when these birds were collected, practically all of the corn from the vicinity in which they were feeding had been gathered, and they could have obtained scarcely any except that which had been left in the field and which

was waste. The contents of four other stomachs that were taken from birds that were killed in the winter were much the same as these except that two of them contained the remains of seeds of *Nelumbo lutea.*

Not a single instance of damage by the feeding of crows was noted in this area during the time of observation, and the facts obtained show that within this area and at the time of these observations the crow was almost entirely beneficial.

A large flock was feeding on the carcass of a dead pig that was on the bar on February 6, 1924.

On winter days crows were often found perched in trees on the bar or on the bluff, where they were usually in small flocks that were calling. Although there were no winter roosts within this area, crows were seen flying up the creek valley nearly every morning in winter, and some were seen flying down the valley toward the east nearly every evening. Usually they flew over the river and a little north of east.

On March 2, 1924, one was chasing another into the air and one was calling. The flocks were not so condensed, and the birds called more than they had at other times during the winter.

At one place on the bar, on March 31, 1923, a crow gave a call note of alarm. Immediately several hundred others assembled from every side, but after flying overhead and calling for a few minutes they left. Fifty yards away a nest was found that appeared to be one of the season and unfinished. Another nest was found on the bar on the south side of the creek. Near it an adult called and left. On April 1, 1923, a nest was found thirty-five yards away from the last-mentioned nest, and another was found fifty yards from the latter. Another bunch of new nest material was found in a near-by tree. All the nests were in cottonwood trees, and they were unoccupied. All the crows that were noted seemed to be restless and to be preparing to nest. Often pairs would leave a flock to fly after one another. On April 7 another nest was found in the group on the bar south of the creek. It was twelve feet from the ground in a cottonwood tree and contained one egg. One of the nests in this group was empty, one held three eggs, and another held five eggs. The crows flew from the nests without making much noise. One bird was sitting on one of the nests on April 28.

On April 20, 1924, a brooding adult left a nest that was twenty-five feet from the ground in a medium-sized elm along the creek. The bird did not fly until the tree was struck.

A family of young crows, just able to fly, was found with a pair of noisy adults in the timber near the bluff on May 29, 1924. A family of young birds was leaving a nest, on the bar, that was fifteen feet from the ground on June 8, 1922.

A nest was found twenty feet from the ground in an oak tree in a ravine on the Whittaker farm on June 11, 1922. The nest was one hundred yards from a Cooper's hawk nest. There were three or four young birds, without feathers, in the nest. No adults were seen near by in the morning or in the evening.

Large flocks of crows were usually found on the area from early fall until early spring. When moving from one place to another the flocks did not usually move together, but moved in smaller groups that followed one another.

On February 17, 1923, a mounted great horned owl was placed in a tree near an old house on the bluff north of the lake. At 3:30, or one hour after the skin was placed in the tree, the crows discovered it and began calling. Within five minutes twenty-five or thirty were calling in the near-by trees. At 3:36 one of the birds was shot. Most of the others left. After one minute they began to return. Then they left, except three which stayed for five minutes. They may have noticed a movement in the building or they may have discovered the fraud. Whenever an owl or a hawk was flushed it was usually discovered and surrounded by a flock of crows within a few minutes.

A much larger number of crows was present during the winter and the seasons of migration than during the summer, when they were usually scattered.

Molothrus ater ater (Boddært).

Cowbird. (45.)

The cowbird was found almost daily during the summer. It was usually found singly or in small groups of three or four. It was found in willows on the bar, along the creek, and in trees on the bluff, as well as on the ground in the fields and pastures, where it was often associated with feeding herds of stock.

Females of this species were often seen in the summer, crawling among the branches of trees on the bluff and on the bar, searching every limb, presumably for nests of other birds, in which the cowbirds might lay their eggs. Species in whose nests cowbird's eggs were found or that were seen feeding young cowbirds are: *Empidonax virescens, Spiza americana, Cyanea passerina, Vireosylva*

olivacea, Icteria virens virens, Geothlypis trichas trichas, Thryothorus ludovicianus ludovicianus, Hylocichla mustelina, and *Cardinalis cardinalis cardinalis.*

The latest record of a young bird is August 31, 1923, when one was being fed by a cardinal. Young were being fed by a Carolina wren on June 17, 1923.

During the seasons of migration this species was found mixed in the flocks of other kinds of Icteridæ that flew over and fed in the fields during the day. The earliest record is April 1, 1923, and the last fall record is November 4, 1923, when some were seen in flocks of grackles.

Xanthocephalus xanthocephalus (Bonaparte).

Yellow-headed Blackbird. (1.)

On May 4, 1924, a yellow-headed blackbird was seen along a slough near the lake on the bar, and one was in a small tree near Doniphan lake. There were several in the *Typha* in the lake on May 17.

One nest of this species was found in *Typha* in the lake on May 30, 1924. It was in a clump of stems, and was two feet above the water. There was no bird on the nest, which contained the shells of some broken eggs of this blackbird.

Agelaius phœniceus phœniceus (Linnæus).

Red-winged Blackbird. (63.)

Not enough specimens of this species have been collected at this location to determine the seasonal occurrence of each of the four subspecies that are found here at some time in the year.

In summer this bird was common in suitable parts of the area, and in the migration seasons it was very common in flocks. Part of the time in the winter one or more subspecies were common.

In summer this bird was found in colonies around the lake, in the willows near the mouth of the creek, and at the marshy places below springs on the bar. At other times it was more general in its distribution, being found in trees along the bluff, on the bar, or in yards, and sometimes on telephone wires along roads. Once a flock was resting on piles of drift that were on the bar. On March 30, 1923, one was feeding on the ground in a burned-over clover field. On February 3, 1924, about four hundred came to a weed patch near the creek on the bar. They came in flocks of about fifty, and the flocks arrived from a few seconds to several minutes apart. All

settled together. After a few minutes they flew to the tops of cottonwood trees near by, and then left in small flocks which flew toward the east. Nearly all were females. On March 29, 1924, some large flocks were seen feeding on the ground and in cornfields on the bar.

In the evening of March 1, 1924, some birds of this species were going to roost in the *Typha* in the lake. Small flocks kept moving from one part of the lake to another until it was too dark for them to be seen across the lake. Some stopped in the *Typha* in the evening of September 22, 1923. A few were seen to stop in patches of *Nelumbo* in the lake.

This blackbird was rather closely restricted to the immediate vicinity of its nesting ground in the summer. Few were seen away from there.

On May 29, 1924, three nests with four eggs each, one nest with three eggs, and several unfinished nests, were found in the *Typha* growing out of the water south of the lake. The nests were from two to three feet from the ground. Near all of them adults were calling, but only one female was seen on a nest. On May 30 three nests with four eggs each, one nest with three eggs, and one nest with one egg, were found in the *Typha* that was growing in the water of the lake. Some females were seen gathering nesting material, and several nests were found that were just started, as well as several that were nearly finished. Those nests that were nearly finished were wet. Several of the nests were within sight of others and two were within twelve feet of one another. The nests were from six inches to two and one-half feet above the water. Adults came near and called when the nests were approched, but they were not very noisy.

A nest was found on June 5, 1923, which was five and one-half feet from the ground, in a willow ten feet high that was growing one hundred yards from the bluff on the bar. A female was sitting on four eggs. Another nest with four eggs was found in a willow near the mouth of the creek. It was six feet from the ground.

A nest was found two feet from the ground in *Typha* in a marshy place on the bar on June 9, 1922. A female was brooding.

On June 12, 1922, a nest was found with five young that was four feet from the water in a willow at the edge of the lake. A nest containing three eggs was found in *Typha* at the lake on June 14, 1922.

On June 27, 1923, a female was seen at the edge of the lake

carrying a straw, and another was seen carrying an excreta sac which it dropped while flying.

The earliest date on which flocks of this bird were seen in the summer is July 17, 1923. In the early spring it was found in flocks as late as April 22, 1924. During the seasons of migration it often joined with other members of its family, especially with the bronzed grackle, in large flocks, which fed over the country together in the daytime and went to roost together in the evening. In the fall these flocks were often seen flying east down the creek valley just before dark. Several small flocks sought protection from cold in thickets of willows on the bar on March 4, 1923.

After the nesting season these birds were moulting, and they were not often seen, except singly, until about the middle of September. On September 5, 1923, most of those that were seen flying across the lake were tailless.

Sturnella magna magna (Linnæus).

Meadow Lark. (4.5.)

Since within this area there was an almost total lack of conditions that resembled prairie, there were few meadow larks. Most of those that were seen were in the upland fields and pastures. Some were seen along the roads within the area.

On October 7, 1922, one was flushed on the flat and nearly bare ground on the south side of the lake. Another was found in almost the same location on November 18, 1923. Although the bird was silent, and thus could not be identified by its notes, it is believed, on account of its light color, to have been *Sturnella neglecta*.

A meadow lark was carrying nesting material in a small bluegrass pasture near the north edge of the area on June 20, 1922.

Icterus spurius (Linnæus).

Orchard Oriole. (30.5.)

A few individuals of this bird were seen almost daily during the entire summer season. It was found in the trees along the bluff, along the creek, on the bar, and in yards around the houses. During the early fall migrations it was found feeding with small transients in the weed patches along the creek. Two young males perched in the tops of clumps of *Typha* in the south part of the lake on June 27, 1923. They sang, and after a few seconds, flew on toward the river. Birds of this species often chose a perch near the top of a tree from which to sing.

A pair was seen feeding a young bird just out of the nest in the E. V. Roundy yard on June 19, 1922. On July 3, 1923, one carried a straw to a nest in the top of a cottonwood near the creek at the edge of the bar. A pair was seen mating in the top of a medium-sized tree in the E. V. Roundy yard on June 4. A nest was found thirteen feet from the ground in the top of a willow on the south side of Doniphan lake on June 7, 1923. A female flew off the nest. After five minutes the male came and perched in a near-by tree. On June 26, 1923, a female brought straw and wove it into the beginning of a nest at the end of a hackberry in the E. V. Roundy yard. This nest was fifteen feet from the ground.

Young birds were seen leaving a nest on July 16, 1923.

A small flock was feeding in weeds along the creek on September 13, 1923.

The first arrival in the spring was noted on May 6, 1923. In the fall none was seen after September 15, 1923.

Icterus galbula (Linnæus).

Baltimore Oriole. (52.)

The Baltimore oriole was found daily in the summer, and usually several were seen each day. It was most common in the large trees around the farm buildings, but it was also found along the bluff and in the trees on the bar. In the fall it sometimes fed in weed patches along the creek.

A female was working on a nest ten feet from the ground in the end of a drooping branch of a maple in a yard on June 4, 1923. A male was singing near by. An incomplete nest was found in the top of a willow tree on the bar on June 6, 1922. A pair of orioles chased a blue jay away from the vicinity, after which the male sang from a near-by tree.

A male was feeding young in a nest at the end of a drooping limb of a large elm in a yard on June 14, 1922. On June 17, 1922, a nest with young was found thirty-five feet from the ground in the top of an oak tree in the timber on the side of a hill north of the lake. Both adults brought food to the young, which called loudly. A nest with young birds was found in a yard on June 26, 1922. It was twelve feet from the ground. Young birds were found in nests as late as July 18, 1923.

Several birds of this species, that were seen together in an oak tree on the bluff on June 29, 1923, may have been the young of a single family. Small flocks were seen in the tops of trees along the

bluff, and with other transients, on May 10, 1923, and May 12, 1923. They stayed in compact flocks. In the fall this species was often a conspicuous part of the feeding and migrating flocks of small birds. On August 27, 1923, this bird was the most common transient in the flock which was feeding in the tops of the trees along the lower part of the bluff. These birds were calling and keeping close together as they fed.

May 6, 1923, is the earliest record for the spring. The latest fall record is September 6, 1923. In 1922 it was last seen on September 2.

Euphagus carolinus (Müller).

Rusty Blackbird. (2.5.)

One of two rusty blackbirds in a small tree along the lower part of the bluff was shot on April 7, 1923. On November 4, 1923, flocks were seen with other blackbirds in the tops of cottonwood trees along the lower part of the bluff north of the lake. The species was seen on November 17 and 18, 1923. On December 1, 1922, one flew from the top of the E. V. Roundy barn to a corn crib.

Quiscalus quiscula æneus Ridgway.

Bronzed Grackle. (19.5.)

In summer the bronzed grackle was infrequently seen within the area studied. It was abundant during the seasons of migration, and sometimes flocks of several thousand were seen. A few were occasionally seen in winter.

Most of the birds of this species that were seen were flying over the area. Sometimes they stopped in the tops of the trees in yards or along the bluff. In the evening of November 3, 1923, several large flocks were flying south along the bluff to a place where they were gathering for the night. Just before dark, on October 20, 1923, small flocks of from one hundred to two hundred birds formed an almost continuous line, flying over the lake from the southeast to the willows on the north edge of the lake. They kept moving back and forth, in flocks, from the edge of the water to the trees. The noise that the flock made could be heard plainly on the bluff west of the lake. Large pine trees near houses were favorite resting places for this bird.

Three were feeding among leaves on the ground on the bluff near the lake on January 24, 1923. One of these appeared to have a broken wing.

One that was seen in the yard at 6:30 in the morning of June 13, 1923, was eating corn at a sheller.

The nest of this species, that was found nearest to the area, was twenty feet from the ground in the top of a box elder along the creek, near Doniphan. An adult was seen flying to the nest on June 17, 1923. Another adult was carrying food near the same creek.

Several good-sized flocks were seen flying down the river on October 28, 1922. They appeared to be following the west bank. Just before dark on that day a flock, stretching in a thin line from the west bluff out over the river as far as it could be seen with a four-power glass, flew down the river. It was flying at a considerable height. On November 8 and 9, 1924, several flocks were seen flying up the creek valley in the morning and down the valley and east over the river in the late afternoon and evening.

The greatest number of this species was present in the spring during the last of March and the first of April, and in the fall from early September until late in November, but small numbers were present throughout the year.

Carpodacus purpureus purpureus (Gmelin).

Purple Finch. (9.5.)

Purple finches were present in groups of two or three flocks of twenty or thirty. They fed in winter in the weed patches along the creek, on the bar, and in the trees and near the ground on the lower part of the bluff. Flocks were often found resting and singing in the willows on the bar and in the small trees on the lower part of the bluff.

This bird was found from October 20, 1923, the earliest fall record, until May 6, 1923, the latest record for the spring. There are no records for December.

Astragalinus tristis tristis (Linnæus).

Goldfinch. (82.)

Goldfinches were seen almost daily. In the summer this bird was found in pairs and at other times of the year it was in small flocks. It fed at the edge of the timber, along the roads, in weeds and willows on the bar, in timber along the creek and on the bluff, in patches of *Typha* at the lake, in fields and in yards. Weed patches were the favorite feeding grounds in winter.

Individuals were several times found bathing in pools in the creek.

No nests were located, although pairs of this species were seen together throughout the summer.

In the fall migration these birds joined the flocks of feeding birds that were present on the bar and along the creek. In the spring they were found with transients singing and feeding in the tops of the trees as they were coming into leaf.

Spinus pinus (Wilson).

Pine Siskin. (8.5.)

The pine siskin was present during the winter in flocks, which were usually not large. It fed with other sparrows in the weeds and trees on the bar, along the lower part of the bluff, and along the creek. Many times it was found with purple finches or other species of the small winter residents.

Records of the occurrence are in the winter months between November 3 and March 16.

Passer domesticus (Linnæus).

English Sparrow. (99.5.)

This sparrow was conspicuous, and was seen daily because it was always present in the vicinity of farm buildings. In other parts of the habitat it was not present throughout the year. It was most numerous in yards and around buildings in the summer. In the winter it joined the flocks of native sparrows to feed in patches of weeds along the creek. Compact flocks were often found in brush piles on the bar in the winter. Many were feeding in a millet patch on August 23, 1923.

The English sparrow nested in holes and nooks about buildings and bridges and in holes in trees in yards. Birds were seen carrying nesting material as late as July 19, 1923. On July 4, 1923, a nest containing one egg was found that was built on the nest of a robin that was in an apple tree in an orchard.

Passerculus sandwichensis savanna (Wilson).

Savannah Sparrow. (1.5.)

This bird was found only three times. One was shot in the top of a small tree on the lower part of the bluff on April 8, 1923. Other records are for birds in the willows on the bar on April 21 and 22, 1924.

Ammodramus savannarum australis Maynard.

Grasshopper Sparrow. (2.)

This sparrow was found in summer in fields on the Whittaker farm. One was shot in an alfalfa field on September 5, 1922.

Passerherbulus lecontei (Audubon).

Leconte's Sparrow. (1.5.)

Single birds of this species were seen in the weeds at the side of a road on April 1 and 7, 1923. One was shot in grass in a marshy place on the bar north of the lake on April 17, 1923.

Chondestes grammacus grammacus (Say).

Lark Sparrow. (4.5.)

A few single lark sparrows were found in pastures and fields and along roads. On June 9, 1922, an adult was brooding four young in a nest on the ground. This nest was in a weed patch at the top of a vertical bank on the Whittaker farm.

One was seen in the brush along the creek on May 8, 1924. Another was seen in a sandy field at the edge of Doniphan lake on May 13, 1923. The only fall record is for September 3, 1922.

Zonotrichia querula (Nuttall).

Harris' Sparrow. (14.5.)

The Harris' sparrow was found during the winter in small scattered flocks in brushy and weedy places on the bar, on the bluff, and along the creek. Piles of brush on the recently cleared ground on the bar and on the bluff were favorite places of refuge for small groups of these birds. On March 30, 1923, one was feeding on the ground in a burned-over clover field.

In the spring this sparrow was present between January 25 and May 13, 1923, and between February 7 and May 8, 1924. Fall dates are between October 20 and December 2, 1923, and October 28 and 29, 1922.

Zonotrichia leucophrys gambeli (Nuttall.)

Gambel's Sparrow. (.5.)

One was shot at the top of the creek bank on the bar on May 4, 1924. Another was seen in a brush pile on the bar on March 21, 1925.

Zonotrichia albicollis (Gmelin).

White-throated Sparrow. (8.5.)

The white-throated sparrow was usually found in small groups of from two to six individuals. It fed in weed patches along the lower part of the bluff, along the creek, and in the brushy places on the bar. It was sometimes found with Harris' sparrow.

The records of occurrence in the spring are between April 8 and

May 13, 1923, and April 5 and May 3, 1924. In the fall this bird was found between October 6 and November 3, 1923.

Spizella monticola monticola (Gmelin).

Tree Sparrow. (22.)

The tree sparrow was one of the most common winter residents of the area. It was found in considerable numbers daily throughout the winter, and it was usually present in loose flocks that were feeding. It fed among weeds on the bar and on the bluff, and in *Typha* near the lake.

October 21, 1923, and April 14, 1923, are the earliest and latest dates of winter occurrence of the tree sparrow in this area.

Spizella passerina passerina (Bechstein).

Chipping Sparrow. (2.)

Although one or two pairs of chipping sparrows probably nested within the limits of the area studied, no nests were found, and individuals were seen only four times. On April 22, 1924, a pair was seen in trees in a yard. One was shot in an alfalfa field on May 12 1923. One was singing in the top of a tree in a yard on June 11. 1922. Another was singing in the top of a tree in a yard on June 28. 1922.

Spizella pallida (Swainson).

Clay-colored Sparrow. (.5.)

One was shot that was singing in brush and shrubbery along a road on April 20, 1924.

Spizella pusilla pusilla (Wilson).

Field Sparrow. (34.)

Several pairs of field sparrows nested in suitable parts of this area. This bird was found in brushy fields, in openings in the timber on the bluff and on the bar, in brush at the edge of timber, and in clearings along the creek. It was more often heard singing than it was seen. It was heard singing as late as September 6, 1923.

On June 14, 1923, a nest was found one and one-half feet from the ground in a clump of coral berry in the edge of a pasture on top of the bluff. It contained one egg. Another was found three feet from the ground on a horizontal limb of an oak sprout eight feet high on July 18, 1923. The nest was shaded and contained two eggs.

April 7, 1923, and March 19, 1925, are the two earliest records of spring arrival. October 11, 1924, is the latest fall record.

Junco hyemalis hyemalis (Linnæus).

Slate-colored Junco. (30.)

Throughout the winter this bird fed in large groups in weeds and brush on the bar, on the bluff, and along the creek. Although it was nearly always on or near the ground, it was sometimes found in the tops of trees. It was sometimes found in brush piles.

In the winter juncos were often flushed in the evening after they had gone to roost in small holes in banks along the roads or on the bluff. They seemed to prefer places that were protected from the wind and where there was a ground cover of loose leaves. Sometimes they were found at night in the tops of shocks of corn in the fields. On January 12, 1923, some were seen going to roost as early as 4:30 in the afternoon.

This species contributed the largest number of individuals to the large flocks of seed-eating winter resident birds.

Juncos, before they left in the spring, were often heard singing from perches in trees.

The earliest date of arrival in the fall is September 24, 1922. In the spring the bird was found as late as April 22, 1924.

Melospiza melodia melodia (Wilson).

Song Sparrow. (26.5.)

Several individuals of this species were seen on each day of work in the winter. They were found scattered singly or in small groups that fed near the ground on the bar and on the bluff. They preferred the vicinity of the lake, and were often flushed from thickets of *Typha* or from weed patches near the water. These growths may have been used for their protective value as hiding places more than for feeding. Birds that were flushed while feeding near by nearly always flew hurriedly to these thickets.

Singing birds were heard in both the fall and the spring.

October 7, 1922, is the earliest fall record, and May 12, 1923, is the latest record for the presence of this bird in the spring. Most of the song sparrows left before the middle of April in both years.

Melospiza lincolnii lincolnii (Audubon).

Lincoln's Sparrow. (13.)

The Lincoln's sparrow was found singly, or in small groups of two or three individuals, near the ground in brushy growths on the bar and in the timber on the bluff. It was also found in the fields and along roads. Some were seen in the wet, grassy places on the bar

and in the growths of *Typha* around the lake, which were good hiding places.

In the fall of 1922 this bird was seen on September 24, October 8 and 28, and December 1. In the spring of 1923 it was found on March 30, April 14, 28 and 29, and May 5, 6, 12 and 19. November 3 is the only fall date for 1923. In the spring of 1924 the bird was seen on February 8 and from April 19 until May 17.

Melospiza georgiana (Latham).

Swamp Sparrow. (8.)

Not more than two or three individuals of this species were seen in a single day. During the migrations the bird was found chiefly in the *Typha* and grass in wet places around the lake and on the bar. It was found a few times in weeds on the bar around the edges of fields or along the creek. On April 8, 1923, one was caught in a mouse trap that was baited with bacon and set among *Typha* plants below a spring along the bluff.

The fall dates of migration are between October 20, 1923, and December 1, 1922. The spring dates are between March 3, 1923, and May 12, 1923, with the larger number of them in April.

Passerella iliaca iliaca (Merrem).

Fox Sparrow. (12.5.)

Small flocks of the fox sparrow were frequently found in the winter, and especially when the bird was migrating. It fed with other seed eaters in the weed patches on the bar and on the bluff, and was usually in the drier portions of the area. Although most of their feeding was on the ground, flocks of this species were frequently seen moving through the tops of the trees. They sought protection in the piles of brush that were left in clearings over the winter.

October 21, 1923, is the first date of occurrence in the fall. There are no December records. In the spring the fox sparrow was seen as late as April 14, 1923.

Pipilo erythrophthalmus erythophthalmus (Linnæus).

Towhee. (21.5.)

A few pairs of the towhee were present at all seasons of the year, but the bird was never conspicuous or numerous. It was found in all the months except January, September and December, when it was probably overlooked.

This bird fed singly or in pairs on or near the ground in brushy places on the bar, along the creek, and especially along the lower edge of the bluff.

A male was heard singing in a small tree along the creek on May 18, 1924, and another was singing in the lower part of the bluff on June 15, 1923. Others were singing in this location on June 20 and 21, 1922.

No nests were located. Two young birds of the season were seen near the ground in the willows on the bar on July 19, 1923.

Cardinalis cardinalis cardinalis (Linnæus).

Cardinal. (100.)

The cardinal was the most numerous and the most evenly distributed species of bird within the area. This is the only species that was found every day that observations were made. From ten to fifty or even more of these birds were always found in a day's work.

During the summer they fed over the whole area where the covering of vegetation was suitable for them to find a food supply. In the winter cardinals joined the other seed eaters and fed in the weed patches on the bar and along the creek. Of course, some were found in other parts of the area, but the larger number spent most of their time in those places where the food was more plentiful and where there was greater protection from disagreeable weather.

On the night of December 2, 1922, several were flushed from their roosting places in brush piles and small bushy trees and vines on the side of the bluff. On March 29, 1923, one was seen that was going to roost in the evening in the tangle of roots under an overhanging bank along the creek.

The loud whistle of this bird was heard on clear days in all parts of the year. It was heard on some of the coldest days of the winter and some of the hottest days of the summer. On March 4, 1923, two males were singing in trees on the bluff that were less than fifty yards apart. Two were singing from the tops of oak trees one hundred yards apart on the side of the bluff on April 7, 1923.

One was bathing in a pool in the creek on July 7, 1923.

Evidence of the approaching nesting season was noted in the activity of this bird early in the spring. On April 8, 1923, two males were chasing the same female through the tops of trees on the bluff. By the fourteenth the birds were less conspicuous than they had been, and they were found in pairs that were scattered over the bluff and the bar.

A female was brooding on a nest in roots under an overhanging bank along the creek on April 20, 1924. The nest was seven feet above the level of the creek bed. It contained three eggs.

On April 28, 1923, a female flew from an empty and unfinished nest in roots four feet below the top of another overhanging bank along the creek. A nest with one egg was found in a vertically hanging grapevine over the creek on May 8, 1924. The nest was seven feet above the water in the creek.

A nest was found four feet from the ground in some brush on the lower part of the bluff on May 11, 1924. It contained two eggs of the cardinal and one of the cowbird. On the ground near by there was another egg of the cardinal, which was broken. A female was near by.

On May 12, 1923, a nest was found in a leafless sapling on a slope of a ravine on the bluff. In it there were two eggs which had holes in their sides one-fourth inch by three-eighths inch in diameter. Each was about half empty. Otherwise the nest appeared to be undisturbed. It was six feet from the ground. This is an example of the dangers which come to nests that are placed in too conspicuous places. On the same day a female was found sitting on a nest five and one-half feet from the ground in a grapevine under a leaning tree on the lower part of the bluff. Another female was brooding three eggs in a nest three feet from the ground in a small scrubby tree on the lower part of the bluff.

On May 26, 1923, a female was sitting on four eggs in a nest in a rosebush along the bluff near the lake. The nest was five feet from the ground. The brooding female did not fly until she was approached closely enough to be touched. She then called very nervously.

A nest was found three feet from the ground in a willow near Doniphan lake on June 3, 1923. There was one egg in the nest, but no bird was in sight.

On June 7, 1923, a brooding female flew from a nest six feet from the ground in the top of a fallen cottonwood, which had its leaves at this time. The tree was on the bar northeast of the lake.

On June 8, 1922, a nest was found four feet from the ground in a clump of elder near a creek. Of the three eggs that had been in the nest only one was left. The others probably had been thrown out by cattle walking through the brush. Another bird was carrying straw and starting a nest three feet from the ground in an elm sprout

at the side of a road. On June 13 there was one egg in the nest. A female was brooding young in this nest on June 28.

A nest was found on June 9, 1922, which was six feet from the ground, in a box elder on the side of a pasture ravine on the Whittaker farm. It contained four eggs, one of which was a cowbird's egg. On the same farm a female was sitting on another nest in an Osage orange tree. This nest was six feet from the ground and had three eggs in it.

A female was sitting on an empty nest six feet from the ground in a shrub covered with a grapevine that was growing on the side of the bluff on June 10, 1922. On June 16 there were two eggs in the nest. On June 10, 1923, a female was brooding two young with wing quills that were in a nest four feet from the ground in coral berry along the lower edge of the bluff. The female flew off when the bush was touched and called nervously from a near-by perch. On June 13 the wing feathers of these birds were beginning to break through the sheaths.

A female was brooding on a nest seven feet from the ground in a grapevine that was growing on a horizontal limb of a small sycamore that was growing at the lower edge of the bluff. The bird left the nest when the vine was touched.

On June 14, 1923, a nest was found three feet from the ground in a leaning dogwood on top of the bluff. The nest was made of leaves, grasses, stems and grapevine strippings. There were three young, with wing feathers showing one-fourth inch beyond their sheaths. They called when they were disturbed, but later became quiet. One of them opened its red-lined mouth. An adult male, with a caterpillar in its mouth, called anxiously near by. A pair of chats came and called.

A female was sitting on a nest nine feet from the ground in ivy that was growing on the trunk of a cottonwood at the edge of a clearing on the bar near the lake on June 19, 1922.

On June 24, 1922, a female was building a nest ten feet from the ground in a willow which was one hundred yards from the edge of the bluff and on the bar.

A pilot snake was taken out of a nest in a grapevine which was growing on a large willow along the creek on July 4, 1923. The nest was ten feet from the ground. Both parents called excitedly from near by.

On July 6, 1923, a female was flushed from a nest eleven feet

from the ground in a grapevine that was growing over a mulberry on the lower part of the bluff near the lake. The nest was near the top of the tree. A male called near by. Another female was working on a nest twelve feet from the ground on a leaning horizontal limb of a small tree in the bottom of a ravine north of the lake on July 10, 1923, one of the hottest days of the summer. A male that was in the same tree left with the female. Work on the nest had just started.

A pair was building a nest in a drooping limb of an elm tree along the creek on July 13, 1923. The nest was nine feet from the ground and was shaded by the rest of the tree. The female gathered the material from the ground and from among the roots of fallen trees on the opposite side of the creek, and from one hundred to two hundred yards away, and carried it directly to the nest. On each trip the male followed fifteen or twenty feet behind the female and stopped ten or twenty feet beyond where the female stopped. The birds were watched between 10:30 and 11:30 in the morning.

A pair called nervously near a nest five feet from the ground in a leafless willow on the bar on July 17, 1923. The nest was made of fine twigs and was fastened to the main trunk by small branches. It contained one egg.

A nest with three eggs was found six feet from the ground in a hickory sprout ten feet high at the edge of the timber on top of the bluff on July 19, 1923. The nest was on a horizontal limb and was unshaded. A female was brooding three eggs.

August 25, 1923, is the latest date on which a nest was found with eggs. The nest found then was five and one-half feet from the ground in an oak sprout at the side of the road, and it contained two eggs. It was unshaded. The brooding female left when approached to within ten feet and called nervously.

A pair was feeding a young cowbird on the bluff on August 31, 1923. A young cardinal, just out of a nest, was seen on September 13, 1923.

Cardinals were frequently found in flocks during the winter. These flocks were made up of birds of both sexes and were rather compact. They moved through the tops of the trees or fed with other sparrows along the creek, on the bluff, or on the bar. In March these flocks broke up into pairs that began to prepare for the coming nesting season.

Hedymeles ludovicianus (Linnæus).

Rose-breasted Grosbeak. (33.)

The rose-breasted grosbeak was represented during the nesting season by only a few pairs of adults. It was found in orchards, in trees around farm buildings, along the bluff, and in trees along the creek. In the season it became more numerous, and was found with other transients on the bar and in other parts of the area. These birds usually fed in the tops of the trees, and when singing the males chose perches in the tops of living or dead trees.

A nest was located seventeen feet from the ground in the top of an apple tree in an orchard on June 13, 1923. It was in a fork of an upright limb, and was made almost entirely of the tendrils of grape. Three young birds, several days old and covered with light gray down, were in the nest. A male called very nervously and flew about the tree when the nest was disturbed. No female was seen. A pair of robins seemed to be concerned about the welfare of the nest, for they came to the vicinity of the nest and called when it was disturbed.

A dead female was hanging from the edge of a nest ten feet from the ground in a box elder along a creek at Doniphan on June 17, 1923.

First records for this species in the spring are May 5, 1923, and May 4, 1924. In the fall it was seen as late as September 10, 1922, and September 15, 1923. Small groups of feeding transients were seen together in the fall as early as August 24, 1923, when they were in trees along the creek. Usually this species did not form compact flocks, but was scattered among the larger flocks of other small transients.

Passerina cyanea (Linnæus).

Indigo Bunting. (65.5.)

The indigo bunting was one of the most numerous summer resident birds of the area. It was uniformly distributed over the terrestrial part of the area, and especially chose those places where the covering of vegetation was composed of brushy shrubs. It preferred the edges of clearings, roadsides, the weedy boundaries of fields, and overgrown fields of weeds and sprouts. Although usually near the ground, it was sometimes found in the tops of trees.

A female was seen carrying straw in an opening in the timber

near the top of the bluff on June 4, 1923. Mating pairs were seen on June 8 and 12, 1923.

A female was brooding three eggs and one egg of the cowbird in a nest which was two feet from the ground in a coral berry along a fence on June 13, 1923. There was a thick growth of nettles four feet high surrounding the nest.

A nest with four young about half grown was found in a small bush along a road on the bluff on June 16, 1922. On the same day another nest was found in a coral berry along the same road. It was one foot from the ground, and held two young about the same age as those in the other nest. The parents were very shy, and did not come near the nest for over half an hour after it was found except once, when the female flew over it. A loosely built nest, that was nearly hidden by leaves, was found five and one-half feet from the ground in the top of a dogwood on the bar north of the lake on June 16, 1923. A female that was sitting on three eggs and one cowbird's egg did not leave until she was almost touched. Both birds called excitedly.

On June 19, 1922, a female was brooding three eggs and one cowbird's egg in a nest nine feet from the ground in a crotch of the main trunk of a young cottonwood. The nest was on the bar, and twenty-five yards from the lower edge of the bluff.

A female was calling near a nest one and one-half feet from the ground in a small elder in a sprout field on top of the bluff on June 26, 1923. In the nest were four young and one egg of the cowbird. The nest was shaded.

A nest was found six feet from the ground in a grapevine on the bluff on June 28, 1923. A female that was brooding three eggs flew off and called when approached.

On June 7, 1923, a nest was found three feet from the ground in the edge of the willows on the bar. It was in a small sycamore sprout, and contained two young and one young cowbird. The cowbird was about twice as large as the young buntings, and was very much more active. The nest was twisted out of shape by the activity of the young cowbird.

Four nests were found in weeds on the bar on July 17, 1923. One was three feet from the ground at the side of a cow path through wild hemp about five feet high, and growing in a dense thicket. There were two eggs in this nest. Another was four feet from the ground and was fastened between two stalks of hemp. It contained

two eggs that were nearly white, each of which had a few spots of brown pigment near the larger end. The spots were small. The brooding female left when approached to within ten feet. The third nest was twenty-five yards from the second, and was four feet from the ground. It was fastened between three stalks of hemp. The female was brooding three light eggs. She left when approached to within five feet. The fourth nest was three feet from the ground in a thistle. It hung between two leaves of the plant. There were three small young in this nest. The female came with food after several minutes. Both parents called in the vicinity.

A female was seen carrying a caterpillar in the edge of the timber on top of the bluff on July 19, 1923.

A nest was found August 18, 1923, that was five feet from the ground in a clump of weeds near the creek on the bar. The brooding female would not leave the four eggs in the nest until she was almost touched. Then she flew near the ground and fluttered as if with broken wings. There were young birds in this nest on August 30.

A nest was found four feet from the ground in sumac along a road on August 23, 1922. It contained four young, whose wing feathers had sheaths that were nearly ready to break. On August 23, 1923, a female with some young, just able to fly, was found in the center of a cornfield on the bar. The parent called nervously. The young birds perched on the stalks of corn and about half way to the top.

Records of arrival in spring are May 6, 1923, and May 8, 1924. The latest fall records are October 8, 1922, and October 7, 1923.

Spiza americana (Gmelin).

Dickcissel. (36.5.)

Several pairs of this species nested in suitable parts of the area. The bird was usually found in summer in weedy fields and openings on the bar and on the bluff. It was also found in brushy places in pastures, along roads, and in the border of brush at the edge of timber, especially on the top of the bluff.

This bird was often heard singing at night as well as in the daytime. It usually sang from a low perch.

A nest was located two feet from the ground in an elder in a pasture on the Whittaker farm on June 9, 1922. It contained three young and one egg.

On June 12, 1923, a nest was found one foot from the ground in a

blackberry bush that was three feet high, and growing in the strip of weeds and shrubs between a wheat field and the timber on top of the bluff. The nest was little shaded, and contained five eggs and one cowbird's egg. The female on the nest flew off when disturbed and called with the male for a few seconds. Then both left.

A female was brooding four eggs in a nest four feet from the ground and in an elder in a brushy field on top of the bluff on June 13, 1923. The sitting bird called once or twice and left. The nest was partially shaded by a bush at the edge of the clump.

On June 22, 1923, a male with a young bird just able to fly was seen in a thick growth of sweet clover in a hog pasture on top of the bluff. An adult with young was found in the tops of trees on the lower part of the bluff on July 9, 1923.

On July 14, 1923, a nest was found, three and one-half feet from the ground, in the crotch of an elder which was growing at the side of a road. The bush, which was about five feet high, shaded the nest. There were four young with down. The parents were perched on a telephone wire overhead. The female brought food and approached the nest after about five minutes. The male was singing. It left its perch to fight with another male about twenty yards away.

A pair was found on July 19, 1923, with young just able to fly. They were in the weeds along the creek. A young bird flew from a nest three feet from the ground in a thistle near the creek on the bar on August 23, 1923. A young bird was killed in the weeds along a slough on the bar on August 31, 1922.

April 28, 1923, is the earliest record for the arrival in the spring. September 7, 1922, and September 13, 1923, are late dates in the fall.

Piranga erythromelas (Vieillot).

Scarlet Tanager. (6.5.)

A few pairs of this tanager were summer residents within the limits of this area. All of them were found on the bluff, and they spent nearly all their time in the tops of the trees there.

Four different males were heard singing in one section of the bluff one-quarter of a mile long on May 6, 1924. On May 12, 1923, a pair was seen on the bluff. A second male approached and was chased away by the first, which then returned to the female. On July 14, 1923, a male was singing in a tree over the road near the creek. Its song was so low that it could scarcely be heard on the ground directly under the tree.

On June 15, 1922, a nest was found twenty feet from the ground in a shellbark hickory on the lower part of the bluff. The nest was small, and was placed on a horizontal limb one and one-half inches in diameter. The female was sitting very closely and did not leave the nest when sticks were thrown into the tree or when other noises were made below the tree. Finally, she was driven off by kicking the base of the tree. She flew a short distance to another tree and called nervously.

May 6, 1923, is the earliest spring record for this bird.

Piranga rubra rubra (Linnæus).

Summer Tanager. (9.5.)

The summer tanager was represented, in summer, in this area by only a small number of nesting pairs. This bird was inconspicuous and was not frequently seen. It was found in trees in farm yards, along the creek, and on the bluff.

On June 16, 1922, a pair was seen four or five times flying about in a yard, and especially in a box elder in which there was a nest of a pair of blue jays. On June 18 the female was seen carrying material to this tree, where she was building a nest on a horizontal limb ten feet from the ground. She kept calling all day. The male was not seen. The female was working on the nest on June 19. On June 21 and 22 she was heard calling in the yard, but was not seen near the nest. The female was sitting on the nest most of the day on June 23, when both adults were near the nest. Once the male was seen giving the female food about ten feet away from the nest. On June 26 there were three eggs in the nest.

A nest was found on a horizontal limb in the top of an oak tree on the bluff west of the lake on June 21, 1923. When the tree was hit the female flew off the nest and to a near-by tree, where she called for several minutes.

On July 15, 1923, a nest was found fourteen feet from the ground in the end of an oak limb along a road near the creek. The nest was one and one-half feet from the end of the limb and twenty feet from the main trunk. The brooding female flew off the nest when the limb was hit with a stick, but she stayed in the vicinity and called. The nest was less than half way to the top of the tree.

The earliest record of arrival is April 28, 1923.

Progne subis subis (Linnæus).

Purple Martin. (30.)

A few migrating martins were seen in the spring of each year. In the early summer a few stragglers were seen flying over, but they did not rest on the area. Later they came to the lake to feed and rest, so that in some days in the fall there were many thousands on the lake at one time. They fed on the flying insects that were found over the water and which they caught while on the wing. They were usually in flocks with other swallows.

Although none nested within this area, martins were common through the summer in all the near-by towns.

On September 23, 1922, this species was the most abundant of the swallows which were feeding over the lake. The birds were scattered and flying close to the water until six o'clock in the evening, when they rose and began flying in a dense flock. The north edge of the flock, above the south edge of the lake, appeared to be more dense than any other edge. The flock was at least half a mile long, but not quite so wide. The birds could not be seen distinctly, and were estimated to be about one hundred yards above the ground. The flock kept moving, and the birds continued to mill until 6:30. At this time they started to fly down to the cat-tails below in a compact, dense, and swiftly moving single column of birds which "poured" straight down to the thicket of cat-tails. After about one-third of the flock had gone down the downward flight was stopped for about one minute. Then it continued until about half the remaining birds had gone down. Then the downward flight was again halted for about a minute, after which all the rest of the birds went to roost in the *Typha* in the same manner as the preceding ones had done. Firing a shotgun caused no movement or excitement among the birds. Walking among the roosting birds caused them to rise a little and to fly on ahead a few steps, but they would not leave. By this time it was too dark to see them distinctly.

Another peculiar flight habit of this species was noted, which may throw some light on the origin of this complex evening flight. Often, while this and other swallows were feeding near the surface of the water in the daytime, small hawks would fly in and attempt to catch one of the birds. Whenever a hawk came all the swallows would gather into a compact flock, which would rise and fly after the hawk until it retired. Then the birds would return to the lake and begin feeding in the usual manner. The flight which takes place before the birds go to roost at night may have been used so often to

escape hawks that it became a habit, and is used even when there is no hawk present.

The earliest spring record for the purple martin is April 19, 1924. September 23, 1922, is the latest that it was seen in the fall.

Petrochelidon lunifrons lunifrons (Say).

Cliff Swallow. (12.5.)

This swallow was most often seen feeding, with other species of the family, over the water at the lake during the spring, and especially the fall migration seasons. It was nearly always much more numerous in the fall. Usually not so many of this species were present as of the other swallows.

Some were flying over the river on May 10, 1924. The only other spring record is for May 29, 1924, when some were feeding over the lake. In the fall this bird was present from August 24 until September 12, 1923.

Hirundo erythrogaster Boddært.

Barn Swallow. (38.)

The barn swallow nested in barns and other buildings in the vicinity. In summer it was seen, in small groups, flying over fields and even over the timber, and sometimes it fed over the water of the lake. Its numbers on the lake increased throughout the summer from the middle of June until the middle of September. This bird rested on telephone wires along the roads, on willow snags around the lake, and on the stems of *Nelumbo* in the lake. Some were seen on the mud south of the lake on September 7, 1922.

On June 9, 1922, a nest was found on the side of a stringer in a barn on the Whittaker farm. It contained young birds. A bird started to build a nest in a hog shed on the E. V. Roundy farm early in the morning of June 8, 1923. It carried mud from a wet place below a near-by spring. The nest was never completed.

A great many barn swallows were feeding over the lake on October 7, 1922. The flock was compact and flew against the strong north wind, in its feeding, until it reached the north side of the lake. Then the whole flock would quickly fly to the south side of the lake and slowly work back to the north. New individuals continued to arrive. Once the flock was disturbed by a hawk.

On October 11, 1924, many small flocks were noted flying south over the lake. When they reached the north side of the lake, the flocks came down to the surface of the water and continued their flight across to the south side, where they rose again and flew on to

the south. Some small flocks were seen flying south high over fields on the bluff on October 12, 1924.

On August 30, 1923, and September 10, 1922, this was the most numerous swallow of those feeding over the lake.

The first record for 1923 is April 28; for 1924 is April 21. In 1922 the last fall record is October 7. In 1924 the last fall record is October 12.

Iridoprocne bicolor (Vieillot).

Tree Swallow. (36.5).

Thousands of tree swallows were sometimes present in the seasons of migration. Of these, a few pairs remained to nest where conditions were favorable. When feeding, this bird was usually found over the water of the lake. Sometimes it fed on the mud at the edge of the water as on September 7, 1922. A few times it was seen feeding over fields on top of the bluff or over the willows on the bar. On June 10, 1922, one was seen flying over the creek. Flocks of this species rested on telephone wires along the roads and in the dead willows in the lake.

This bird was found nesting in the summers of 1922, 1923 and 1924. This is the only record of which I know of the nesting of this species in Kansas.

On June 7, 1923, a nest was found in a hole in a leaning willow stump fifty yards from the edge of the water on the land at the south side of Doniphan lake. The hole was six feet from the ground. The nest was lined with chicken feathers. A female flew out of the nest to a near-by stump where a male came and they mated.

A pair was seen mating on a dead willow on the north edge of the lake on May 30, 1924.

A pair of adults was feeding young birds in a nest three feet above the water in a hole in a willow stump in the north part of the lake on June 12, 1922. On each trip the parent at the nest did not leave until the other one arrived.

On June 13, 1922, another nest, with young which were being fed by adults, was found in another willow stump near the one found on June 12. Another nest was found in a hole in a stump that was two feet above the water. This nest was built of fine strips of bark covered with chicken feathers from one to four inches long. A side of the stump was torn away and the nest, with the five white eggs which it contained, was taken out. An adult returned to the stump and attempted to find the nest. It stayed at the stump for over half

an hour. Parents were still feeding young in nests in the willow stumps on June 16.

The presence of water near the nest site seems to be a necessary condition for the nesting of this bird in this locality, since in the season of 1923, when the lake was nearly dry, it did not nest there, but nested at Doniphan lake, four miles away, where there was water. In the spring of 1924 there was water in the lake, and the tree swallow again nested there in the same stumps as in 1922.

Small flocks that were flying south over the lake on October 11, 1924, flew low over the water to feed.

The earliest spring record for this species is April 5, 1924, when one was flying close to the water in the center of the lake. The latest fall record is October 21, 1923.

Riparia riparia (Linnæus).

Bank Swallow. (17.)

A small number of bank swallows was present during the summer. The species became much more numerous in the fall. It fed over the water of the lake, over the river, and over the creek. This species was found a few times with other swallows on telephone wires along the roads.

The earliest spring record is May 10, 1924. The latest fall records are for September 10 of both 1922 and 1923.

Stelgidopteryx serripennis (Audubon).

Rough-winged Swallow. (37.)

A few individuals were seen frequently during the summer, and they helped make up the large flocks of migrating swallows in the spring and fall. This bird fed over the lake, over the river, over fields and pastures, over the bluff, and, especially in summer, over the water in the creek.

The rough-winged swallow rested on telephone wires and fences along the roads, on drift in the river, and in trees and on snags at the edge of the lake and the creek.

One was seen flying out of a hole in a vertical bank along the creek on June 15, 1922. One was hovering at the entrance of a hole in the bank of the creek on May 18, 1924.

In 1923 the first was seen on April 15. The earliest spring record in 1924 is April 19. The latest fall record is October 20, 1923.

Bombycilla cedrorum Vieillot.

Cedar Waxwing. (7.)

The cedar waxwing was found in groups of from one or two to about one hundred individuals. It was usually found in the tops of the trees on the bluff or on the bar.

The stomach of one that was killed on August 23, 1922, contained a snail and a berry of some wild fruit. Some were feeding on hackberries on March 3, 1923.

This bird was found very irregularly. It was recorded on the following dates: January 29, 1923; March 3 and 30, 1923; April 29, 1923; May 6, 12 and 19, 1923; and May 8 and 12, 1924; June 5, 1923; August 23, 1922; September 7, 1923; and November 30, 1923.

Lanius ludovicianus migrans W. Palmer.

Migrant Shrike. (5.)

Migrant shrikes were not found within the area in summer, although the bird nested along the roads through the surrounding farm land. It was usually found in Osage orange or in other thickets along the roads or perched on telephone wires. A group of five or six was seen on the wires along a road two miles west of the area on July 14, 1923.

There are only two records for the seasons of migration. On March 30, 1923, one was eating insects on the ground in a field that was being plowed and on which crows were feeding. On September 2, 1922, one was shot in the brush on the lower part of the bluff at six o'clock in the morning.

Vireosylva olivacea (Linnæus).

Red-eyed Vireo. (58.5.)

Red-eyed vireos were evenly distributed during the summer over the bluff, along the creek, and on the older portions of the bar. This bird was usually found in the tops of the trees. It was heard singing throughout the summer.

A nest was found five feet from the ground in a dogwood on the bar north of the lake on June 7, 1923. It was made of coarse material and contained three eggs and one cowbird's egg. Two adults were perched near by. Another nest was found on the same day seven feet from the ground in a tall maple on the bar east of the lake. It was hanging from a fork of a horizontal limb three-eighths of an inch in diameter and was made of paper and strips of the

inner bark of a tree. It contained three eggs. The adult called two or three times from a near-by perch. On June 16 the adult stayed on the nest until it was almost touched. In the nest at this time were one young and two eggs.

On June 28, 1923, a nest was found five and one half feet from the ground in the end of a branch of an oak on the bluff west of the lake. The brooding bird slipped off the nest quietly. In the nest were four eggs and one egg of the cowbird. On July 6 a young cowbird was trampling two young vireos in this nest. There was an unhatched egg in the nest.

An adult was feeding two young cowbirds just out of the nest on August 22, 1923.

A bird was building a nest nine feet from the ground in a box elder on the lower part of the bluff northwest of the lake on June 19, 1922.

Some young birds were calling loudly in a nest fifteen feet from the ground in a tree along the creek on August 23, 1921.

In the fall this bird was one of the most numerous in the flocks of migrating birds which fed in the brush along the lower part of the bluff and in the willows on the bar. Dates of first occurrence in the spring are May 6, 1923, and May 3, 1924. Late fall records are September 10, 1922, and September 14, 1923.

Vireosylva philadelphica Cassin.

Philadelphia Vireo. (1.)

One was collected in the willows on the bar with other vireo and warbler transients on September 2, 1922. Another was shot in the same location on September 24, 1922.

I know of no other records for this species in Kansas, and of no other fall records for it in the Kansas City region.

Vireosylva gilva gilva (Vieillot).

Warbling Vireo. (29.5.)

This vireo was found in considerable numbers in both the spring and fall, but only a few pairs stayed through the summer.

In summer this bird was usually found on the bar near the lake or in groves of medium-sized cottonwood trees. In the summer of 1923 a pair stayed in a group of cottonwood trees near the edge of the bar all summer, but their nest was not located. The bird was sometimes seen in apple trees in orchards.

While migrating this bird fed with other vireos and warblers on the bluff, along the creek, and in the weeds and trees on the bar.

The warbling vireo was first seen in 1923 on May 5, and in 1924 on May 3. In 1922 the last was seen on September 10, and in 1923 on September 15.

Lanivireo flavifrons (Vieillot).

Yellow-throated Vireo. (3.)

One was shot in the timber on the bluff on April 29, 1923. A pair was heard singing on the lower part of the bluff on May 3, 1924 On July 14, 1923, one was singing in the tops of the trees on the bluff west of the north edge of the lake. One was collected on the bluff on August 23, 1921. Another was seen in the willows on the bar with other transients on September 2, 1922.

Lanivireo solitarius solitarius (Wilson).

Blue-headed Vireo. (4.5.)

One was shot in a tree on the bluff on May 6, 1923. Another was shot that was feeding in the brush on the bluff August 29, 1922. Others were feeding in weeds and willows on the bar, along the creek, and on the bluff on September 2, 10 and 24, 1922; September 7, 14 and 15, 1923; and October 7, 1923. Generally only one or two were found together and they were in flocks of small transients.

Vireo griseus griseus (Boddært).

White-eyed Vireo. (29.5.)

This vireo was found in the brush along the lower edge of the bluff, at the edge of the timber on the bluff, and in small clearings in the timber throughout the summer. About fifteen pairs nested within the area. The bird was nearly always found near the ground, even when singing.

On June 12, 1922, a pair of adults was seen with food near a large rock at the west edge of the lake. The nest could not be found, although a diligent search was made. On April 8, 1923, the nest was found in a bush of coralberry and two feet from the ground.

A pair with food in their mouths was calling excitedly in some brush in the timber about half way to the top of the bluff on June 29, 1923. The nest was located one and one-half feet from the ground, in the end of a branch of an elm eight feet high. It was partly shaded. Bits of rotted wood were fastened to the outside of the nest in which there was a young cowbird whose wing feathers were one-fourth inch beyond their sheaths. The adults stayed near

the nest and called and sang, sometimes on limbs as high as twenty feet. On July 6 adults were feeding a young cowbird on the bluff one hundred yards west of this nest. The nest was empty. On the outside it measured three and one-half inches deep and two and one-quarter inches wide. Inside measurements were two and one-half inches deep and one and three-fourths inches wide. It was lined with fine grasses.

In the fall and in the spring this bird fed with other small transients in the willows on the bar and in the brush on the bluff.

The earliest spring record is May 6, 1923, and the latest fall record is September 13, 1923.

Vireo bellii bellii Audubon.

Bell's Vireo. (45.)

The Bell's vireo is a very characteristic bird of the growths of willow thickets that grow on the newly formed bars along the Missouri river. The type specimen of this species was collected in the bottom lands across the Missouri from where this work was done. (Harris 1919, p. 313.)

In summer this vireo was found in willows on the bar, along fences of Osage orange, in the farm land, and in the fields of sprouts on top of the bluff. During the migrations it joined other small transients that fed on the bar and the lower part of the bluff.

On June 5, 1923, a nest was found five feet from the ground in a small cottonwood east of the mouth of the creek on the bar. It was made of coarse material and held four eggs. The brooding bird flew off the nest when disturbed and began singing in the tree in which the nest was located.

A nest was found two and one-half feet from the ground in a dogwood three feet high near the east edge of the willows north of the lake on June 7, 1923. It was made chiefly of cottony material, with some leaves on the outside and some fine plant material on the inside. The adult, which was brooding three eggs, slipped off the nest quietly, but returned after about two minutes and called. Then it sang.

Three nests were located on June 8, 1923. One was on a lower branch of a dogwood five feet high that was growing east of the lake. It was three feet from the ground, and was shaded by other shrubs and trees. There were four eggs in the nest. The brooding bird left when approached to within twenty feet. Another nest was in the top of a slender willow five feet high, which was surrounded by

willows ten to twelve feet high and by some weeds. The nest was made of grass and leaves and was grayish in color. On the outside it measured two and three-fourths inches deep and two and one-half inches wide. There were four sparsely spotted eggs in the nest. No bird was seen on the nest, but one was calling nervously thirty feet away. The third nest was one hundred yards from the second one, and was five feet from the ground in a willow seven feet high. It was hanging from a fork of a branch and was reddish in color. There were three eggs in the nest, but no bird was seen near.

On June 9, 1922, an empty nest was found five feet from the ground in the end of a branch of Osage orange along a lane on the Whittaker farm. No birds were seen. An adult was brooding three eggs in this nest on June 17. The bird left when the nest was approached to within two feet.

A nest was found one and one-half inches from the main trunk of a willow and four and one-half feet from the ground on June 10, 1923. The tree was ten feet high and was growing on a line between the willows and the *Typha* on the south side of the lake. There were three eggs in the nest. A bird was singing near by, but none was on the nest. Another bird was seen building a nest, two and one-half feet from the ground, in a small brushy willow. This was at a point fifty yards from the edge of the willows southeast of the lake.

The earliest spring record is May 3, 1924. The last record for 1922 is September 5; the last 1923 record is September 6.

Mniotilta varia (Linnæus).

Black-and-white Warbler. (12.)

The black-and-white warbler was usually found in small groups of two or three, which fed on the main trunks and branches of trees on the bluff and about ten feet from the ground in the willows on the bar.

Only two birds were seen in the summer months. A male was feeding on the trunks of trees in a ravine on the bluff on June 10, 1922. Another bird was seen flying through some oak timber north of the lake on June 17, 1922.

In the spring transients were present between April 28, 1923, and May 20, 1923. Migrants were more numerous in the fall, and were found through a longer period of time. They were seen almost daily with other fall transients. The records are between August 23, 1921 and 1922, and September 15, 1923.

Protonotaria citrea (Boddært).

Prothonotary Warbler. (16.)

A small colony of less than a dozen pairs of this warbler nested in holes in willow snags on the north side of the lake each summer. During the nesting season these birds were rarely found in any other part of the area. Here they flew back and forth from stump to stump singing, feeding, and carrying on other activities of their daily life.

On June 12, 1923, a nest was found four feet from the ground in a willow stump five feet high, at the edge of an open place on the northeast side of the lake. The nest was made of grasses and was built up to within a few inches of the opening. The female, that was brooding four eggs, flew off the nest and sang. A male was singing near by. The opening of the nest hole was irregular and was large. It was two and one-half inches wide and six inches high in its greatest dimensions. The stump was at the edge of the lake bed, but there was no water in sight.

Another nest was found one hundred yards away in a hole six feet from the ground in a stump eight feet high. The opening was two inches in diameter, and the nest was three and one-half inches below the lower edge of the opening. The nest contained eggs, but the number could not be determined. A female that was on the nest flew off when the stump was hit with a stick and attempted the broken wing ruse until she was about thirty feet away, when she flew and began calling more excitedly than had the bird at the last nest. There was grass and *Polygonum* growing around the stump, but there was no water within sight.

A third nest was five and one-half feet from the ground in a nearly dead willow stump seven feet high that stood north of the lake. The opening of the nest hole was one and one-half inches in diameter. The next was three and one-half inches below the opening, and it contained at least four eggs. There was a dense growth of *Polygonum* three feet high around the stump. The brooding female flew off the nest and attempted the broken wing ruse. Both parents called excitedly. There was a chickadee's nest in a similar stump fifteen feet away.

In 1922 there was standing water around the stumps in which the nests were found in 1923. The number of nesting birds appeared to be about the same for both seasons. On June 16, 1922, a nest was found five feet above the water in a hole in a willow stump in the

north part of the lake. The nest was made of grass and was two inches below the opening. There were three eggs in the nest. Both the male and the female stayed near. On June 19 both parents were feeding young birds in this nest.

After the end of the nesting season in June very few of these birds were seen until the migration started in August. A female was seen along the edge of the river near the mouth of the creek on June 29, 1923. None was seen in July. In the fall migration it was found from August 3 until September 10 in 1922. At this time of year it fed with other warblers on the bluff and on the bar, but was not found on the nesting ground. It was also found on the bluff and on the bar during the spring migration. The earliest record for the spring is May 5, 1923.

Helmitheros vermivorus (Gmelin).

Worm-eating Warbler. (1.)

One was singing in the tops of the trees in a ravine on the bluff in the middle of the morning of July 11, 1923. One was shot with other transients in the tall weeds in the edge of the willows on the bar on September 10, 1922.

Vermivora pinus (Linnæus).

Blue-winged Warbler. (2.)

One was singing in the tops of trees half way to the top of the bluff on June 16, 1923. It moved around within one hundred and fifty yards of where it was first heard.

One was found on the lower part of the bluff on August 18, 1923. Another was taken on the bluff on August 26, 1921. One was shot in the willows on September 4, 1922.

Vermivora ruficapilla ruficapilla (Wilson).

Nashville Warbler. (9.5.)

This warbler was found during the migrations, sometimes in considerable numbers, as on September 13, 1923, when it was the most common small transient noted. It fed in the tops of the shrubs and the smaller trees on the bluff and in the trees and weeds on the bar and along the creek.

Not so many were seen in the spring as in the fall. May 6 and 12, 1923, are the only spring dates, and only one bird was seen on each of these. In the fall the first was found August 27, 1921; August 24, 1922; and August 23, 1923. It was present until September 24 in 1922.

Vermivora celata celata (Say).

Orange-crowned Warbler. (4.5.)

This warbler was found in the trees on the bluff on April 28, 1923; May 5, 6 and 12, 1923; May 10, 1924; October 6 and 7, 1923; and October 12, 1924. It was usually seen on the lower part of the bluff.

Vermivora peregrina (Wilson).

Tennessee Warbler. (3.5.)

The Tennessee warbler fed with other migrating warblers in weeds and willows on the bar and along the creek and in the trees on the bluff. Usually not many individuals were seen in a single day.

Spring records are between May 6 and 19, 1923. In the fall the bird was found on August 31, 1923; October 8, 1922; and October 11, 1924.

Compsothlypis americana pusilla (Wilson).

Northern Parula Warbler. (17.)

A few pairs of this bird stayed all summer to nest along the lower portions of the bluff, where they were heard singing in the tops of the large and medium-sized trees. They also fed among the branches of these trees. On June 28, 1922, an adult male was seen feeding young just able to fly, in willows on the bar along the lower edge of the bluff and near the mouth of the creek.

During the migrations this bird was found on the brushy, lower part of the bluff and on the bar with other warblers, but chiefly on the bluff. The earliest record for spring is April 19, 1924. The last one was seen, in 1923, on September 13.

Dendroica æstiva æstiva (Gmelin).

Yellow Warbler. (18.)

This is another warbler that was represented in the area in summer by only a few nesting pairs. During the nesting season it was restricted almost entirely to the growth of willows and cottonwoods on the bar. The birds fed and nested in the tops of these trees.

On June 7, 1923, a nest was found eight feet from the ground in a willow on the south side of Doniphan lake. The brooding female returned to the nest, which held five eggs, about five minutes after she was flushed from it. The male stayed near by, but did not move very nervously. The nest was in the same tree with, and five feet below, a nest of the orchard oriole.

A nest was found five feet from the ground in a crotch of a

willow twelve feet high on the bar southeast of the lake on June 8, 1923. The nest was made of closely woven grayish material. The outside diameter was larger at the center than at the rim. Inside, there were five eggs. A pair of adults was seen near, but not on the nest. On June 10 the female was on the nest. The male came and called when she was frightened off the nest.

During the migrations this bird was found with other transients on the bluff and along the creek. A few were seen in trees in yards. The first spring record is for April 28, 1923. None was seen in the fall later than September 5, 1922. On August 28, 1923, one was seen, alone, along a fence of Osage orange six miles northwest of the area.

Dendroica coronata (Linnæus).

Myrtle Warbler. (8.5.)

This warbler was found in small flocks in trees in yards, along the bluff, along the creek, and on the bar, both in the spring and fall migrations.

The records for spring are between April 21, 1924, and May 20, 1923. Fall records are from October 20, 1923, to November 8, 1924.

Dendroica magnolia (Wilson).

Magnolia Warbler. (1.)

One was shot out of a flock of migrating warblers in trees on the lower part of the bluff on May 19, 1923. Another was shot near the same location on May 20, 1923.

Dendroica cerulea (Wilson).

Cerulean Warbler. (1.)

One was seen in a tree in a ravine on the bluff on June 13, 1922. Another was singing in the middle branches of a medium-sized tree along a road on the lower part of the bluff on June 26, 1922.

Dendroica striata (J. R. Forster).

Black-poll Warbler. (.5.)

One was collected from a small flock of migrating warblers that was feeding in the trees in a farm yard on the evening of August 27, 1923.

Dendroica fusca (Müller).

Blackburnian Warbler. (.5.)

One was shot in a medium-sized tree on the lower part of the bluff on September 3, 1923.

Dendroica virens (Gmelin).

Black-throated Green Warbler. (1.)

One was taken in the top of a tree along the creek on August 28, 1923, and another was found in a flock of migrating warblers along the creek on September 13, 1923.

Dendroica vigorsi (Audubon).

Pine Warbler. (.5.)

One was shot out of a flock of other warblers in the top of a tree along the creek on September 13, 1923.

Seiurus aurocapillus (Linnæus).

Ovenbird. (3.)

In the spring and fall the ovenbird was found near the ground on the lower part of the bluff and on the bar with small transients. No evidence of its nesting was found. One was singing near the ground on the lower part of the bluff on May 4, 1924. The only other spring record is for May 20, 1923. Fall dates of occurrence are between August 9, 1922, and September 14, 1923. On the last date several were seen in willows on the bar.

Seiurus noveboracensis notabilis Ridgway.

Grinnell's Water Thrush. (8.5.)

Grinnell's water thrush was found singly at the edge of the lake, along a slough on the bar, and at the edge of a pool below a spring. Sometimes it was found in patches of *Nelumbo* or of *Typha* growing in moist or wet soil at the edge of the lake.

On May 6, 1923, one flew into a yard from the bar and called once or twice. Then it flew back among the trees on the bar where it was lost. Spring records are between this date and May 19, 1923. One was seen at a spring north of the lake on May 11, 1923. Two were seen along the creek on May 18, 1924.

In the fall this bird was more restricted to the vicinity of the lake than in the spring. Migration records are between August 21 and September 4, 1922.

Seiurus moticilla (Vieillot).

Louisiana Water Thrush. (.5.)

A pair was seen along a branch of the creek near the west edge of the area on April 20, 1924.

Oporornis formosus (Wilson).

Kentucky Warbler. (27.5.)

Kentucky warblers were rather unevenly distributed over the bluff and along the creek during the nesting season. They were found in those places where the undergrowth was dense, or where there was a canopy of shade overhead. These birds spent most of their time on the ground. Nesting pairs became very nervous when their territory was entered, and would often call excitedly when certain sections of the timber were disturbed.

One was seen bathing in water below a spring on June 14, 1922. On May 6, 1923, several were flying and chasing each other on the side of a ravine on the bluff. Some of them sang from trees.

On June 30, 1923, a nest was found on the ground between two weed stalks that were seven inches apart. It was made of sticks and leaves and was lined with finer material. Both parents were carrying food in the morning. The nest was not found until 4:30 in the afternoon. The brooding female ran out on the ground, with drooping wings, when she was approached to within two feet. She ran about ten feet and then flew. During the hour and a half that the search for the nest was made, the male stayed within twenty yards of the nest and called excitedly. Once he brought food but ate it himself. He stayed in the trees, and twenty or more feet from the ground. The male was chased away from one small tree several times by a brooding female humming bird which had a nest there. These birds used two call notes, one of which was much more harsh than the other. In the nest were two young with their wing feathers still in the sheaths. The yellow color below showed plainly. On July 2 the nest and young birds were gone and one of the supporting weeds was broken. The parents were still in the vicinity, but they were not nearly so nervous as they had been two days previously.

In the spring and the fall this warbler joined other members of the family in migrating flocks that moved and fed over the bluff, along the creek, and on the bar.

The first spring record is for April 29, 1923. In the fall this species was found as late as September 14, 1923.

Oporornis philadelphia (Wilson).

Mourning Warbler. (8.)

During the years when this study was made the mourning warbler was much more common at this point on the Missouri river than it

has been found to be by observers in other parts of the valley in other years. Because of its reported scarcity in other parts of the valley all the records for this area are given here.

On May 19, 1923, at least twenty-five, most of them males, were seen near the ground in willows on the bar and along the lower edge of the bluff. On May 20, 1923, this was the most numerous of the migrating warblers. It was found on May 10, 17, 29 and 30, 1924. Fall dates are August 23 and 24, 1921; August 29 and 31, 1922; September 2, 4, 7 and 10, 1922; and September 13 and 14, 1923. The bird which was taken on August 29, 1922, was bathing at a spring on the lower part of the bluff. Others were found near the ground on the bar and on the bluff.

Geothlypis trichas trichas (Linnæus).

Maryland Yellowthroat. (23.)

A few pairs of this yellowthroat nested on the ground studied. They were found in weedy and grassy growths near water on the bar and along the creek. One was found at the edge of the timber on top of the bluff on July 6, 1923.

On June 7, 1923, a nest was found in sedges north of the lake. It was built on dead plants six inches from the ground and was partly shaded. The top was open. The female, which was brooding five eggs, flew silently away when she was flushed.

Another nest was found in sedges on the bar north of the lake on June 12, 1923. This nest was one foot from the ground. It contained three young with feathers, one unhatched egg, and one cowbird's egg. Both parents were seen near by with food, but they would not go near the nest for about half an hour. The female stayed about twice as far away from the nest as the male, and both called excitedly. The young were not out of the nest on June 16. The cowbird's egg was still in the nest and the male was calling near by.

On June 12, 1923, a nest was found in grass growing two and one-half feet high northeast of the lake where there was a scattered growth of *Typha*. The ground had been burned over during the preceding winter. The female was brooding five eggs. She did not flush from the nest until she was almost touched.

In the migration season this species joined other warblers on the bar and on the bluff, but it was nearly always found near the ground. The earliest spring record is May 3, 1924. September 14, 1923, is the latest fall record.

Icteria virens virens (Linnæus).

Yellow-breasted Chat. (34.)

Chats were found daily throughout the summer. They were found wherever there were thick tangles of undergrowth in the timber on the bluff, on the bar, in pastures, in cleared land, and in timber along the creek. Usually they kept near the ground and were hard to locate except by their call.

Several times in the summer this bird was found bathing at a spring or in water below the spring. On May 12, 1923, one sang as it flew from the bar to the bluff and accompanied the song by a peculiar jerking of the tail.

A nest was found on June 5, 1923, that was two and one-half feet from the ground in a willow about four feet high on the south side of the lake. One bird was sitting on three eggs in the nest and another was perched in the top of a small tree ten yards away.

On June 8, 1923, a nest was found two and one-half feet from the ground in a fork of a willow five feet high that was south of the lake. The nest was made of grass and was nearly as coarse as the usual red-winged blackbird's nest. It was about four inches in outside diameter. There were three eggs. The brooding bird did not leave the nest until it was approached to within five feet.

In a clearing on the bar north of the lake a nest was found two and one-half feet from the ground in a rosebush on June 12, 1923. This clearing had grown up in *Equisetum* which was three feet high. The nest was partially shaded by the rosebush, but not by trees. There were four young in the nest, the largest of which had a V-shaped patch of down which ran from the top of the wings. The brooding adult flew off the nest when approached to within thirty feet and called in the vicinity.

On June 12, 1923, a nest was found two and one-half feet from the ground in a clump of coralberry. This was in an opening on the bluff. No bird was seen, but there was one egg in the nest and one cowbird's egg. There were no more eggs on June 13. On June 18 there were three chat's eggs and one cowbird's egg, and an adult, which left when approached to within three feet, was sitting on them. There were young birds in the nest on June 28. Neither parent was seen near the nest when it was visited on July 2. One of the young birds opened its mouth for food. The nest was empty on July 10.

On June 13, 1923, a nest was found three and one-half feet from the ground in a dogwood which was growing in an unplowed field on

top of the bluff. In the nest were three newly hatched young and one egg. Neither parent was seen.

A nest was found with four eggs on June 16, 1923, that was five and one-half feet from the ground, in the top of a small grapevine which grew on the side of a cottonwood fifteen feet high. The tree was in the *Equisetum* north of the lake on the bar. The outside of the nest was made of leaves and coarse stems. The brooding bird left when approached to within eight feet, and then called from a distance. On the same day another nest, with four eggs, was found in a grapevine on a small dead willow stump on the bar north of the lake. The brooding bird left this nest silently and flew near the ground when approached to within ten feet.

A nest was found in a field of sprouts on top of the bluff west of the lake on June 29, 1923. It was four feet from the ground and contained five eggs. Both parents came and called much like catbirds.

The latest date on which an occupied nest was found was July 19, 1923. The nest was three feet from the ground in a thistle in a patch of weeds between the willows and a cornfield on the bar. It was partly shaded and contained four eggs. The brooding female left the nest when approached to within five feet. A male was singing near by.

A chat was seen in a hedge fence along a road near the creek on September 6, 1923. Two were seen in willows on the bar on September 5, 1922. One was shot in some weeds along a slough on the bar on August 31, 1922. A female that was shot on August 27, 1921, had eaten a large number of pokeberries. These are the only records for the occurrence of this species in the fall. Very few were seen in July or August.

May 6, 1923, is the earliest record for the spring.

Wilsonia pusilla pusilla (Wilson).

Wilson's Warbler. (11.5.)

Wilson's warbler was found frequently in migrations, and was present in varying numbers from one or two up to about fifty individuals, which is the number found on September 6, 1922, when this species was the most common warbler in the area.

It was found feeding and moving through the tops of the trees on the bluff, on the bar, and along the creek, usually within ten feet of the ground. In the spring this warbler preferred the bluff for a

feeding ground, and in the fall it preferred the willows and growths of weeds on the bar and along the creek.

In the spring this warbler was found between May 10, 1924, and May 19, 1923. The period of migration for this species extended over a longer period in the fall, and the birds were found from August 23, 1921, and August 25, 1922, until September 10, 1922, and September 14, 1923.

Wilsonia canadensis (Linnæus).

Canada Warbler. (2.)

A Canada warbler was seen in low bushes on the bluff north of the lake on May 20, 1923.

Two were collected near a spring along the lower edge of the bluff on August 23, 1921. On August 24, 1921, one was taken in the willows on the bar. One was shot in a thick growth of willows on the bar on August 27, 1923. Weeds were thick under the trees at this place.

Setophaga ruticilla (Linnæus).

Redstart. (19.)

Several pairs of redstarts stayed all summer along the bluff and on the bar, but no nests were found. They fed and sang in the tree tops, especially along the roads on the bluff, throughout the month of June. On July 6, 1923, one flew to an oak sprout in a field on top of the bluff.

On August 30, 1922, one became entangled in a spider's web in some bushes on the lower part of the bluff and was struggling to free itself, when a gun was fired near by, which caused it to put forth greater exertions, and by so doing to gain its freedom.

During the season of migration this bird was found on the bluff and in the weeds and willows on the bar and along the creek. In the spring it arrived in April (April 28, 1923). It was most numerous from the middle of August until the middle of September. On September 10, 1922, this was the most abundant transient warbler that was feeding on the bar. Most of the redstarts were feeding about fifteen feet from the ground. September 15, 1923, is the latest fall record for this species.

Mimus polyglottos polyglottos (Linnæus).

Mocking Bird. (1.)

One was seen along a road eight miles from the area on June 24, 1922, and there is one record for the area on August 23, 1921.

Dumetella carolinensis (Linnæus).

Catbird. (36.)

The catbird was not found over the whole area in summer, but it was common in those portions where the amount and character of the cover of plants was suited to its habits. In summer this bird was found along the creek, in orchards, in thickets on the bar and on the bluff, and in fields of sprouts. It was frequently seen on or near the ground in farmyards.

One was seen carrying a ripe cherry near Doniphan lake on June 25, 1922. Another was eating a large insect in the creek bed on July 18, 1923.

A nest was found six feet from the ground in a small elm on the creek bank on June 10, 1922. The nest, which contained one egg, was well shaded.

On June 7, 1923, a nest was found four feet from the ground on the side of a willow tree at the edge of Doniphan lake. The nest contained one egg. An adult was calling near by.

On June 22, 1923, a nest was found three feet from the ground in a gooseberry bush in a small pasture near the creek. The nest was empty. Remains of a young bird, with wing feathers which projected one-half inch beyond their sheaths, lay on the ground. The bird had been partly eaten by some animal.

A bird was seen carrying nesting material on June 25, 1923. Its nest was found on July 3. It was nine feet from the ground in the center of an apple tree in an orchard. An adult was brooding three eggs. Both birds of the pair called near by.

In the spring and fall catbirds joined other small birds to feed on the bluff, on the bar, and along the creek. The first in the spring was seen on May 6, 1923. October 7, 1922, is the latest record in the fall.

Toxostoma rufum (Linnæus).

Brown Thrasher. (31.5.)

The brown thrasher was found in thick growths of shrubbery along the roads, along the creek, on the bluff, and on the bar. It usually fed and spent most of its time in the brush near the ground, but it sometimes selected a perch on the highest branch of a tall tree from which to sing.

On May 29, 1924, a nest was found four feet from the ground in a gooseberry bush in a small brushy pasture near the creek. No bird was seen near, but there were two eggs in the nest.

An adult was brooding three eggs in a nest six feet from the

ground in a vine which was growing over a dead stump on the lower part of the bluff on June 13, 1923. There were young in the nest on June 26. One parent was on the nest and the other was near by. This nest was empty on July 5. Another nest was found on July 5 that was seven and one-half feet from the ground, on a leaning trunk of a small dogwood fifteen yards west of the empty nest. There were two eggs in this nest and a pair of adults calling from near by.

On June 20, 1922, a nest was found five feet from the ground in an Osage orange along a road. It contained three eggs. A pair of adults was near.

A bird was brooding four eggs in a nest six feet from the ground in a plum thicket near Doniphan lake on June 22, 1922. It did not leave until the nest was touched.

An empty nest was found four feet from the ground between two cottonwood trees on the bar on June 29, 1923. A pair of adults was seen near, one of which had a caterpillar in its mouth. On July 4 the nest contained one egg. An adult was brooding on July 6.

On June 30, 1923, a nest was found five feet from the ground in the brushy top of a dead, fallen apple tree in a dogwood thicket at the edge of a small clearing on the bluff. An adult, which was brooding four eggs, did not move until the bush was touched. It then called from a near-by perch.

A nest was found three feet from the ground in an oak sprout five feet high in a pasture on top of the bluff on July 18, 1923. A parent was brooding two recently hatched young and one egg. The nest was rather shallow. The sprout was surrounded by sprouts and sweet clover.

Brown thrashers were found scattered through flocks of smaller transients in the fall. The earliest spring record is April 14, 1923. In the fall none was seen after October 7, 1922.

Thryothorus ludovicianus ludovicianus (Latham).

Carolina Wren. (89.)

The Carolina wren was present throughout the year in all parts of the area that are timbered. It chose especially those places where the undergrowth was thick or where there were piles of brush, logs, or of some other kinds of trash. It usually fed near the ground and was found in pairs or singly. This bird sang throughout the winter.

A female was building a nest in a hole in a bank at the edge of a small opening in the timber on the bluff on April 28, 1923. She made about one trip a minute after material, which she got from a place

on the ground and about ten yards away. She went to the nest by the same route each time. The male was singing in the top of a small tree twenty feet away. It left when disturbed, but returned six minutes later. On May 12 there was one wren's egg and one cowbird's egg in the nest. An adult was brooding.

Another nest was found in a hole in a bank on April 28, 1923. This one was at the side of a road near the creek, and contained young which the parents were feeding. The nest was empty on May 5.

On May 13, 1923, a nest was found in a hole in a cut at the side of a road near the E. V. Roundy house. The hole was about a foot deep and did not run straight. An adult was sitting closely upon four eggs. By May 19 two of the eggs had hatched, and on May 20 three were hatched. On April 21, 1924, an adult was flushed from a nest in the same hole. There were young birds in the nest on May 3 and 8, but the nest was empty on May 17.

A nest was found in a hollow stump nine inches high and eight inches in diameter on the bluff on June 21, 1922. The nest was roofed over and was made of moss, leaves and grass. In the nest were four young and one egg. The brooding bird left immediately when disturbed and did not return for five minutes. Then she left again and returned in another five minutes. No sound was made by the parent bird. Only one adult was seen.

On August 28, 1923, a nest was found in a washed-out hole in a vertical bank of the creek. It was ten feet above the bed of the creek and six feet below the top of the bank. The nest contained partly feathered young birds. One parent brought food, called a few times, and left.

Empty nests were found on tops of stumps, in bridges, and in the tops of sheds. One was seen feeding two young cowbirds on June 17, 1922. Family groups were frequently seen along the bluff at various times during the summer.

Troglodytes aëdon parkmanii Audubon.

Western House Wren. (49.5.)

Several pairs of this wren spent the summer around the various groups of farm buildings on the area. A few were found on the bar, in orchards, and along the creek during the summer. The birds stayed close to their nesting sites.

A pair was seen at the opening of a tin-can nest that was nailed to the side of a garage, on May 6, 1923. Parents were feeding young

birds in this nest on June 13 and 14. Two were singing in the dead willow stumps northeast of the lake on June 12, 1923. A partly built nest was found in a hole in one of the stumps. It was five and one-half feet from the ground.

Adults were feeding young in the cornice of a schoolhouse on June 14, 1923.

On June 17, 1923, one was cleaning out material from a hole in a dead limb ten feet from the ground in a box elder in a yard. This was at 5:30 in the evening. The bird was taking out feathers and sticks and dropping them to the ground near the hole. Once it became entangled in a straw, but its extra exertions caused it to free itself.

One flew into a hole in a partially dead apple tree that was twelve feet from the E. V. Roundy house and eight feet from the ground, on July 7, 1923. The bird would not leave the nest when the tree was hit. Another was singing in the same tree.

On July 11, 1923, one was sitting on five eggs in a crevice in a porch. Later in the season the young birds from this nest were killed by a cat.

In the fall this bird joined small transients in the weeds on the bar, along the creek, and on the bluff. Then it was found singly or in small groups and it fed near the ground.

April 19, 1924, is the earliest record and October 11, 1924, is the latest record in the fall for this species. Birds that were seen in the fall were not plentiful and they were usually silent.

Nannus hiemalis hiemalis (Vieillot).

Winter Wren. (2.5.)

One was seen in a thick growth of grass and *Typha* along the north edge of the lake in the morning of March 3, 1923. It was very restless and stayed near the ground. On February 5, 1924, two were seen along the road on the lower part of the bluff. Another was found in the same location on November 17, 1923. On October 24, 1924, one was found on the lower part of the bluff north of the lake. It was shot, and in its stomach were found parts of seeds and small insects.

Cistothorus stellaris (Naumann).

Short-billed Marsh Wren. (.5.)

One that was singing was shot in the grass and weeds south of the willow snags north of the lake bed on May 12, 1923. It was close to the ground.

Telmatodytes palustris iliacus Ridgway.

Prairie Marsh Wren. (8.)

Several pairs of this wren spent the summer in the growth of *Typha latifolia* that grew in and around the lake. More were found in the fall than in the spring.

On May 30, 1923, several empty nests were found in *Typha* in the lake, and the adults were singing near by.

On June 12, 1923, one was found in weeds along a fence north of the lake on the dry part of the bar.

On August 21, 1922, an adult and young, which had no tail, were found in the *Typha* south of the lake. On August 28, 1922, a young bird with tail feathers about half grown was shot south of the lake. Singing birds were seen on September 10, 1922.

In the spring this bird was found in the marshy, wet places below the springs at the edge of the bar. The earliest spring record is April 28, 1923. None was seen in the fall after October 8, 1922.

Certhia familiaris americana Bonaparte.

Brown Creeper. (11.)

Brown creepers were found feeding on the trunks of trees on the bluff, on the bar, along the creek, in orchards and in yards, throughout the winter. They were found singly or in small groups, which were usually scattered, and with larger groups of other birds that moved through the timber feeding.

On November 3, 1923, one moved over the surface of a log, a fence post and the trunk of a tree in turn. Some that were feeding on January 31, 1924, spent about half their time on the ground.

This species was noted in the fall on October 28, 1922; October 21, 1923; and October 24, 1924. The latest spring record is April 15, 1923.

Sitta carolinensis carolinensis Latham.

White-breasted Nuthatch. (10.)

Although this bird was probably present throughout the year, it was most numerous during the winter months, when it was found in the timber along the creek and on the bar. A few were seen on the bar in willows. It was found singly or in small groups of less than four individuals, and could nearly always be located by its call. Some that were found along the creek on November 17, 1923, spread their wings and tails and called when near each other.

Sitta canadensis Linnæus.

Red-breasted Nuthatch. (3.)

This nuthatch was found feeding with flocks of sparrows in weeds on the bar and along the creek and in trees along the creek in the winter. Usually from one to three were seen on each occasion.

Three were seen together on November 3, 1923. Others were seen on January 12, 1924; February 1 and 4, 1924; March 16, 1924; and April 20, 1924.

Bæolophus bicolor (Linnæus).

Tufted Titmouse. (90.)

The tufted titmouse was found wherever there were trees in the area. Pairs were evenly distributed during the nesting season. Several were found in nearly every day's work. It fed among the branches of the trees. On April 14, 1923, one brought a moth to a limb of a small tree and after holding it for a few seconds fed it to another adult.

A family of young was found with their parents along the creek on June 15, 1922. An adult was feeding young in a hole in a natural cavity of a tree at the edge of the E. V. Roundy yard on May 19, 1923. The nest was four feet from the ground.

On June 16, 1923, a nest was found five and one-half feet from the ground in a hole in an oak tree on the bluff which was ten inches in diameter. The brooding adult did not fly out when the tree was pounded, but left when its mate called from near by. There were five eggs in the nest. The hole was six inches in diameter, and was filled with leaves and fur up to the lower edge of the opening. The opening was irregular and was ten inches high by two inches wide. The nest was empty on June 28.

A nest was found in a natural cavity in a redbud near the top of the bluff west of the lake on June 28, 1923. The trunk of the tree was six inches in diameter and the hole was three inches in diameter. The top of the nest was seven inches below the bottom of the opening. In the nest were five young with wing quills one-eighth of an inch long. One of them opened its mouth for food. Both parents called in a near-by tree. The nest was empty on July 6.

A pair was seen carrying nesting material on April 19, 1924. They were flying along the creek.

In August and September birds of this species joined the flocks of small transients which fed in the timber. Flocks of variable size,

but not large, were to be found through the winter until the warm weather of early spring, when the pairs were again distributed through the timber.

Penthestes atricapillus atricapillus (Linnæus).

Chickadee. (98.5.)

The chickadee was one of the most common birds of the area, being found nearly every day that records were kept. This bird was found over all types of the land where there was sufficient vegetation for it. It fed in the trees and shrubs in the timber, and even in the brush and weeds near the ground.

On April 14, 1923, a pair was carrying material from a hole in the underside of a limb in a tree on the bank of the creek. The birds always perched on a near-by weed before entering the hole. On each trip they carried the material to a different place before dropping it. Sometimes both birds were in the hole at the same time. An adult was flushed from the nest on May 12. Both birds called nervously.

A chickadee made several trips to a hole in a stump on the lower part of the bluff on April 15, 1923. On each trip it came out and dropped something from its bill. Several feathers were lying scattered around the stump on the ground. On April 28 an adult could be seen on a nest in the hole, but it would not flush from the stump. On May 12 the adult flew off the nest when a finger was poked into the hole and, with its mate, called nervously.

A pair was working at a dead stump on an elm along a road on May 13, 1923. They were flying alternately to a hole ten feet from the ground. One was heard picking at wood on the inside. After picking a few minutes it flew with some pieces of wood in its bill which it dropped from a near-by branch. This was repeated several times. A pair was seen carrying material to a hole in the top of a fence post along a road on May 19, 1923.

A nest, with five young nearly ready to fly, was found in a hole five feet from the ground on June 7, 1923. It was in a willow stump on the bar on the north side of the lake. The nest was made chiefly of rabbit fur. An adult came with a caterpillar in its mouth and called.

An adult was brooding at least three eggs in a nest in a dead willow stump on the north side of the lake on June 8, 1923. When the stump was hit with a stick the bird flew off and called excitedly.

On June 12 the sitting bird flew off this nest when it was approached to within ten feet.

A pair was seen feeding young in a nest in a hole fifteen feet from the ground in a dead cottonwood stump along a road on the bluff on June 9, 1922.

In the fall and in the winter chickadees joined flocks of small birds that fed through the timber in the trees and in the weeds. They were nearly always a part of these flocks, and were not often seen, except with other birds, in those seasons.

Penthestes atricapillus septentrionalis (Harris).

Long-tailed Chickadee.

Two chickadees that were collected on February 18, 1923, belonged to this form.

Regulus satrapa satrapa Lichtenstein.

Golden-crowned Kinglet. (13.)

The Golden-crowned kinglet was found singly or in small groups on the bluff, on the bar, and along the creek during the winter. It fed among the branches of the trees and in the weeds near the ground. On January 31, 1924, one was feeding on the ground at the edge of a pool along the creek. One was feeding in bunches of grass along the creek on January 15, 1924. In especially stormy weather these birds preferred to stay in the branches of coniferous trees where there was more protection from the wind than in the bare deciduous branches.

October 20, 1923, is the earliest fall date of occurrence and April 7, 1923, is the latest record for the spring.

Regulus calendula calendula (Linnæus).

Ruby-crowned Kinglet. (13.5.)

This kinglet was found in about the same types of habitat as its near relative, but it was present in a little greater numbers and at slightly different seasons.

Although this species nests much farther north than does the last, it arrives at this area earlier in the fall and leaves later in the spring, and it was not found in this region in winter. Fall records are between September 14, 1923, and October 29, 1922. In the spring it was found from March 30, 1923, until May 12, 1923.

Polioptila cærulea cærulea (Linnæus).

Blue-gray Gnat Catcher. (40.5.)

This bird was found commonly in the timber on the bluff in the summer. It usually fed in the tops of the trees and the higher shrubs.

On June 4, 1923, a nest was found in a walnut tree along a road on the bluff. Material was being added to the outside of the nest which had just been started on a limb twenty feet from the ground. Both the adults scolded vigorously when a red-eyed vireo came near, and they continued to do so until the vireo left. Another nest that was nearly finished was found two-thirds of the way to the top of an oak along a road on the same day. Both birds of the pair were calling in the tree.

A sitting bird flew off a nest twenty-five feet from the ground in an elm tree along a road on June 6, 1923.

A pair was building a nest two feet below the top of an oak tree twenty feet high on June 12, 1923. The tree was on the bluff. The nest was on top of a limb five-eighths of an inch in diameter. Both birds of the pair brought material and added it to the nest. Each stood in the center of the nest and added the new material to the outside by drawing the bill upwards from the branch. The birds called occasionally while working on the nest.

One was seen carrying nest material on June 14, 1922. On this day one tried to chase a hawk out of a tree on the bluff. One flew after a blue jay on the bluff on June 26, 1923.

During the season of migration this bird was also found along the creek and on the bar in the trees. The earliest spring record is April 19, 1924. In the fall of 1922 this bird was found as late as September 1, and in the fall of 1923 it was found as late as September 15.

Hylocichla mustelina (Gmelin).

Wood Thrush (48.)

Wood thrushes were seen daily throughout the summer, and were distributed over the parts of the area more suitable for nesting. They were usually found feeding on or near the ground in the timber where the shade was rather dense, either on the bar, along the creek, or on parts of the bluff. Early morning and late evening were the times of day at which there was greatest song activity. They usually sang from low perches, but sometimes selected the tops of

trees, and even the tops of dead trees, where they were conspicuous for their evening songs.

On June 4, 1923, a nest was found nine feet from the ground on a lower limb of a linden tree on the bluff. The outside of the nest was made chiefly of leaves. The sitting adult did not leave until it was touched with a stick. Another nest was found twelve feet from the ground in a small elm tree in a shaded ravine on the bluff. The bird left the nest when the tree was shaken.

A nest was found twelve feet from the ground in a lower limb of a large elm tree on the lower part of the bluff on June 12, 1923. The brooding bird clucked as it left the nest when the limb was hit. Another nest was found on the lower limb of an elm tree along the lower edge of the bluff on the same day. This one was twenty feet from the ground, and was two-thirds of the way to the top of the tree. The brooding bird left the nest but stayed near by and called from limbs that were fifteen or twenty feet from the ground.

A bird was seen carrying food on June 16, 1923. A pair was seen feeding young on the lower part of the bluff on June 26, 1923. Another pair was found, with young birds just out of the nest, on the bluff on June 29, 1923. Adults were seen feeding young cowbirds on June 30 and July 5, 1923.

On July 4, 1923, a nest was being built six and one-half feet from the ground in a dogwood on the side of a ravine on the bluff.

On July 14, 1923, a nest was found eight feet from the ground on a lower horizontal limb of an oak tree on the side of a hill and along a road. An adult was brooding. On July 19 the nest contained two thrush's eggs and two cowbird's eggs.

An adult was flushed from a nest next to the main trunk of a willow and eight feet from the ground on August 2, 1922. The nest was fifty feet from the creek on the bar.

An adult was brooding three eggs in a nest seven feet from the ground in a dogwood half way to the top of a ravine on the bluff on August 9, 1922. The bird left the nest reluctantly and fluttered near by. The nest was shaded. Another bird that was near by kept up a low clucking.

During the migrations this thrush was often found singly with small birds that were feeding near the ground on the bar or on the bluff. The earliest record of occurrence is May 3, 1924. None was seen later than September 15, 1923.

Hylocichla aliciæ aliciæ (Baird).

Gray-cheeked Thrush. (1.5.)

Gray-cheeked thrushes were collected near the ground on the lower part of the bluff on May 12, 13 and 20, 1923.

Hylocichla ustulata swainsoni (Tschudi).

Olive-backed Thrush. (2.5.)

All the records for this bird are of transients that were seen near the ground on the lower part of the bluff from May 6 to May 20, 1923, and from May 3 to May 30, 1924.

Hylocichla guttata pallasii (Cabanis).

Hermit Thrush. (.5.)

A hermit thrush was seen on the lower part of the bluff on April 6, 1925.

Planesticus migratorius migratorius (Linnæus).

Robin. (68.5.)

Several pairs of the robin were found in summer in farm yards and in orchards near houses. A few were found in timber along the creek. Few were present during the winter, and they were usually in sheltered places in the timber on the bluff or along the creek.

Some flocks were seen feeding on hackberries on February 17 and 18, 1923. On March 30, 1923, about fifty were feeding on the ground in a burned-over clover field. One picked a berry from a rosebush on the lower part of the bluff on March 31, 1923. One was feeding on the ground in a plowed field near the creek on April 14, 1923. A robin was feeding on the ground in a freshly cut alfalfa field on June 5, 1923. Some were eating pokeberries on November 4, 1923, and on February 7, 1924, one was feeding on sumac that was growing at the side of a road.

On February 17, 1923, a flock was found roosting in the tops of some rather exposed small trees along the edge of the bluff. Robins were often seen perched in the tops of tall trees. From these perches they called and sang.

An adult was sitting on four eggs in a nest twelve feet from the ground in the center of a box-elder tree in a yard on May 13, 1923. When it was disturbed the bird called loudly. Another came, and both appeared to be very nervous. One of the pair was standing on the edge of the nest on May 19.

A robin was seen carrying straw to start a nest in a maple tree in

a yard on June 7, 1922. The nest was nearly finished by evening. On June 8, 1923, a bird was building a nest in the top of a maple tree in a yard. It brought some of the material from a point at least one hundred and fifty yards away from the nest.

One adult was feeding another on June 16, 1923.

Although the species was present throughout the year, there was a noticeable movement of robins in the migrating seasons. They flocked with the small transients that fed on the bar and on the bluff. Flocks were frequently seen flying high down the creek valley or in some other direction in the evening of days in the winter or in a migration season.

Sialia sialis sialis (Linnæus).

Bluebird. (43.5.)

Bluebirds were found in summer in orchards, in small clearings on the bluff, on the bar, in pastures where there were trees, and along roads and fences between fields. Nesting pairs were scattered, because they required a suitable cavity in which to place their nests. A pair was seen in the center of a cornfield in which the corn was three inches high, on June 12, 1923. A large flock was found in a pasture on July 14, 1923. Some were feeding on the ground. Some were in living and dead trees, and some were perched on the tops of fence posts. The number of individuals present in the winter, when they were usually found in small groups of four or five, was smaller than at other seasons.

On April 1, 1923, one brought a large insect to a female which was on a limb of a stump along a road. The female took the insect and the pair flew across the road together. A nest was built in the stump, but it was never used. A pair was seen at a hole in a partially buried tree trunk in the creek bottom on April 14, 1923. The female was in the hole most of the time, while the male was perched on a weed two feet away or at the entrance of the nest hole. Both left and returned to the tree several times. The male was calling. On April 28 the female was brooding and would not leave the nest when the trunk was pounded. The male was perched on top of a tree fifty yards away. On April 29 the female left the nest when it was approached to within six feet. The male was seen carrying a caterpillar near the nest on May 12.

A family of young birds, just out of the nest, was found with adults along a slough on the bar on May 30, 1924.

A female was sitting on five eggs in a nest in a post along a road

on June 17, 1922. The nest hole was six feet from the ground. Another nest was found in a post near Doniphan lake on June 7, 1923. This one was three feet from the ground and it contained three eggs.

A nest was found in an apple stump near a road on the lower part of the bluff on June 11, 1923. The nest was seven feet from the ground. A female flew out of the hole when the stump was hit. The nest was four inches below the opening. Its contents were not determined. On June 22 the pair was feeding young in the nest. Young birds were heard calling in the nest on June 28. On June 30 the nest was empty.

A nest was found on July 1, 1923, that was four feet from the ground in a fence post between a pasture along a creek and a cornfield. The nest was made of grasses, and was four inches below the opening. It contained four eggs. There was a bird near, but none on the nest.

Small flocks of the size of family groups were found together from the time the first young left the nest in summer until they were separated into pairs in the following spring.

BERKELEY, CAL., January 15, 1928.

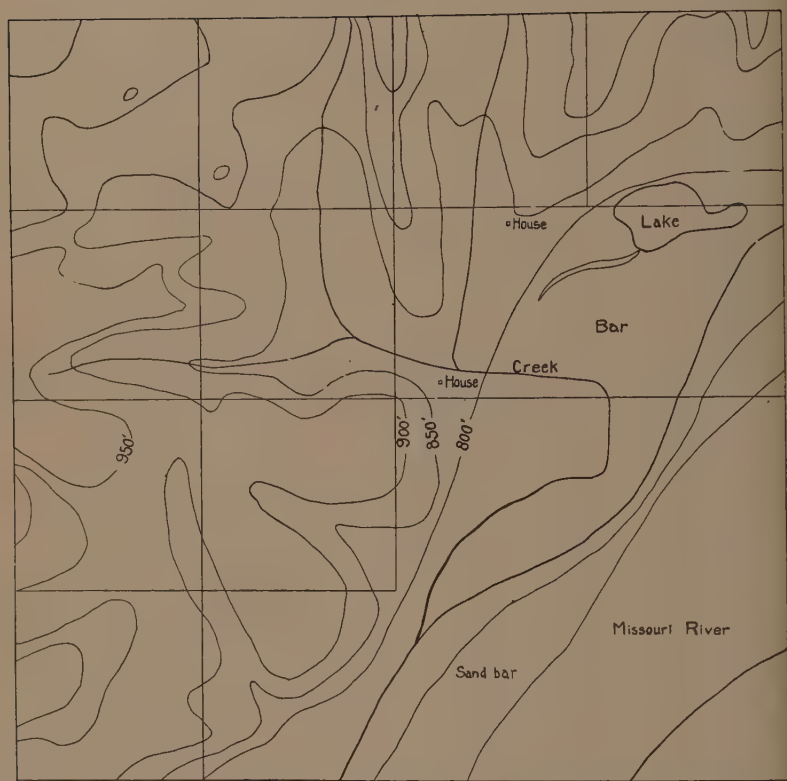

FIG. 1. Map of the area studied. The 800-foot contour line roughly marks the division between the bluff and the river bottom. Scale: one inch equals one mile.

TABLE OF THE OCCURRENCE OF EACH SPECIES BY MONTHS AND BY HABITAT DIVISIONS.

Name of Bird.	Month.												Habitat divisions.																
	January	February	March	April	May	June	July	August	September	October	November	December	River	Creek	Lake	Lake shore	Typha	Slough	Salix-Pop	Creek timber	Bluff	Timber edge	Sprouts	Orchard	Road	Pasture	Field	Yard	Building
Pied-billed grebe				+	+			+	+	+	+				+														
Herring gull		+	+	+	+	+							+		+	+													
Ring-billed gull				+		+							+		+	+													
Franklin's gull				+	+						+		+														+		
Bonaparte's gull											+		+																
Forster's tern					+			+							+														
Least tern						+	+	+	+				+		+	+													
Black tern					+	+		+	+						+	+													
Double-crested cormorant					+										+														
White pelican				+	+				+	+			+																
Merganser	+	+	+	+							+		+		+														
Red-breasted merganser											+		+																
Mallard	+	+	+	+	+	+		+	+	+	+	+	+	+	+														
Black duck											+		+																
Gadwall			+								+				+														
Baldpate			+							+			+					+											
Green-winged teal			+	+						+	+				+														

OCCURRENCE OF EACH SPECIES—CONTINUED.

	Name of Bird.	Blue-winged teal	Shoveler	Pintail	Wood duck	Redhead	Lesser scaup duck	Ring-necked duck	Snow goose	Canada goose	Bittern	Least bittern	Great blue heron	Little blue heron	Green heron	Black-crowned night heron	Virginia rail	Sora
Habitat divisions.	Building																	
	Yard																	
	Field																+	
	Pasture																	
	Road																	
	Orchard																	
	Sprouts																	
	Timber edge																	
	Bluff																	
	Creek timber																	
	Salix-Pop														+	+		
	Slough	+													+			+
	Typha											+	+		+	+	+	+
	Lake shore	+	+								+		+	+	+	+		+
	Lake	+	+	+	+	+	+	+					+		+	+		
	Creek												+		+			
	River				+				+	+			+		+			
Month.	December																	
	November	+	+				+	+		+								
	October	+		+	+						+		+					
	September	+		+	+						+		+	+	+	+	+	+
	August	+			+							+	+		+	+		+
	July												+		+			
	June	+		+	+		+					+	+		+	+		
	May	+	+	+			+					+	+		+	+		+
	April	+	+	+		+	+			+			+		+	+		
	March		+	+			+		+	+			+					
	February			+			+			+								
	January			+														

OCCURRENCE OF EACH SPECIES—CONTINUED.

Name of Bird.	Month.												Habitat divisions.																
	January	February	March	April	May	June	July	August	September	October	November	December	River	Creek	Lake	Lake shore	Typha	Slough	Salix-Pop	Creek timber	Bluff	Timber edge	Sprouts	Orchard	Road	Pasture	Field	Yard	Building
Coot				+	+	+			+	+	+				+	+	+												
Wilson's phalarope					+											+													
Wilson's snipe				+	+					+	+			+		+	+	+											
Long-billed dowitcher					+				+							+													
Stilt sandpiper					+											+													
Pectoral sandpiper			+	+	+	+		+	+	+					+	+													
White-rumped sandpiper					+	+		+	+							+													
Least sandpiper					+	+		+	+							+													
Semipalmated sandpiper					+	+		+	+							+													
Hudsonian godwit					+											+													
Greater yellowlegs				+					+						+														
Yellowlegs			+	+	+	+		+	+	+					+	+													
Solitary sandpiper				+	+			+	+					+	+	+		+											
Willet					+			+							+	+													
Buff-breasted sandpiper								+								+													
Spotted sandpiper					+	+	+	+	+				+	+	+	+		+											
Long-billed curlew					+											+													

OCCURRENCE OF EACH SPECIES—CONTINUED.

Name of Bird.	Month.												Habitat divisions.																
	January	February	March	April	May	June	July	August	September	October	November	December	River	Creek	Lake	Lake shore	Typha	Slough	Salix-Pop	Creek timber	Bluff	Timber edge	Sprouts	Orchard	Road	Pasture	Field	Yard	Building
Black-bellied plover						+		+							+	+													
Killdeer			+	+	+	+		+	+	+						+													
Semipalmated plover					+	+		+	+						+	+													
Bobwhite	+		+	+	+	+	+	+	+	+		+							+	+	+				+				
Mourning dove	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+			+	+	+	+	+	+
Turkey vulture				+	+	+	+	+	+										+		+								
Marsh hawk	+	+	+	+		+		+	+	+									+		+								
Sharp-shinned hawk		+			+													+	+										
Cooper's hawk	+	+		+	+	+	+	+	+	+	+				+				+		+								
Red-tailed hawk	+	+	+	+	+	+	+	+	+	+	+	+							+		+	+							
Red-shouldered hawk					+		+	+	+		+								+	+	+	+							
Swainson's hawk				+																	+								
Broad-winged hawk					+	+		+	+										+		+								
Rough-legged hawk	+									+		+									+						+		
Bald eagle	+	+	+																		+								
Sparrow hawk									+																+	+			
Osprey								+					+																

OCCURRENCE OF EACH SPECIES—CONTINUED.

Name of Bird.	Month.												Habitat divisions.															
	January	February	March	April	May	June	July	August	September	October	November	December	River	Creek	Lake	Lake shore	Typha	Slough	Salix-Pop	Creek timber	Bluff	Timber edge	Sprouts	Orchard	Road	Pasture	Field	Yard	Building
Long-eared owl			+																+										
Short-eared owl	+		+									+							+										
Barred owl										+	+								+		+								
Saw-whet owl			+																+										
Screech owl	+	+	+	+	+	+	+	+	+	+	+	+								+	+			+				+	+
Great horned owl				+		+	+	+	+	+		+								+	+								
Yellow-billed cuckoo					+	+	+	+	+	+					+	+	+		+	+	+	+	+			+		+	
Black-billed cuckoo					+	+		+	+										+		+								
Belted kingfisher			+	+	+	+	+	+	+	+			+	+	+			+											
Hairy woodpecker	+	+	+	+	+	+	+	+	+	+	+	+							+	+	+			+				+	+
Downy woodpecker	+	+	+	+	+	+	+	+	+	+	+	+							+	+	+			+				+	
Red-headed woodpecker	+	+	+	+	+	+	+	+	+	+									+	+	+	+			+			+	+
Red-bellied woodpecker	+	+	+	+	+	+	+	+	+	+	+	+								+	+			+				+	+
Northern flicker	+	+	+	+	+	+	+	+	+	+	+	+							+	+	+	+			+			+	+
Whippoorwill				+	+	+	+	+	+											+	+								
Nighthawk					+			+	+						+													+	
Chimney swift				+	+	+	+	+	+	+					+				+									+	+

OCCURRENCE OF EACH SPECIES—CONTINUED.

		Ruby-throated humming bird	Kingbird	Crested flycatcher	Phœbe	Olive-sided flycatcher	Wood pewee	Acadian flycatcher	Alder flycatcher	Least flycatcher	Prairie horned lark	Magpie	Blue jay	Crow	Cowbird	Yellow-headed blackbird	Red-winged blackbird	Meadow lark
Habitat divisions.	Building				+													
	Yard	+	+	+	+		+						+	+			+	
	Field	+	+								+			+	+		+	
	Pasture	+													+			+
	Road		+		+						+		+		+		+	+
	Orchard	+	+															
	Sprouts																	
	Timber edge		+															
	Bluff	+	+	+	+	+	+	+	+	+			+	+	+		+	
	Creek timber	+	+	+	+		+			+		+	+	+	+		+	
	Salix-Pop	+	+	+	+		+	+	+	+			+	+	+		+	
	Slough				+											+	+	
	Typha															+	+	
	Lake shore													+		+		+
	Lake		+		+									+		+	+	
	Creek		+											+				
	River		+											+				
Month.	December												+	+			+	
	November												+	+	+		+	+
	October												+	+	+		+	+
	September	+	+	+	+	+	+		+	+			+	+	+		+	+
	August	+	+	+	+	+	+	+	+	+			+	+	+		+	+
	July	+	+	+	+		+	+					+	+	+		+	+
	June	+	+	+	+		+	+	+		+		+	+	+		+	+
	May	+	+	+	+		+		+	+			+	+	+	+	+	
	April			+	+				+	+	+		+	+	+		+	
	March				+								+	+	+		+	
	February										+		+	+			+	
	January											+	+	+			+	
	NAME OF BIRD.																	

OCCURRENCE OF EACH SPECIES—CONTINUED.

	Name of Bird.	Orchard oriole	Baltimore oriole	Rusty blackbird	Bronzed grackle	Purple finch	Goldfinch	Pine siskin	English sparrow	Savannah sparrow	Grasshopper sparrow	Leconte's sparrow	Lark sparrow	Harris' sparrow	Gambel's sparrow	White-throated sparrow	Tree sparrow	Chipping sparrow
Habitat divisions.	Building			+					+									
	Yard	+	+	+	+		+		+					+				+
	Field				+		+		+		+		+					+
	Pasture				+								+					
	Road				+		+					+	+	+			+	
	Orchard																	
	Sprouts								+									
	Timber edge						+											
	Bluff	+	+	+	+	+	+	+	+	+				+		+	+	
	Creek timber	+	+		+		+	+	+				+	+		+	+	
	Salix-Pop	+	+	+	+	+	+	+	+	+				+	+	+	+	
	Slough											+					+	
	Typha	+					+										+	
	Lake shore				+													
	Lake						+											
	Creek						+											
	River																	
Month.	December			+	+		+	+	+					+			+	
	November			+	+	+	+	+	+					+		+	+	
	October				+	+	+		+					+		+	+	
	September	+	+		+		+		+		+		+					
	August	+	+		+		+		+									
	July	+	+		+		+		+				+					
	June	+	+		+		+		+		+		+					+
	May	+	+		+	+	+		+				+	+	+	+		+
	April			+	+	+	+		+	+		+		+		+	+	+
	March				+	+	+	+	+					+			+	
	February					+	+	+	+					+			+	
	January				+	+	+	+	+					+			+	

OCCURRENCE OF EACH SPECIES—CONTINUED.

	Name of Bird.	Clay-colored sparrow	Field sparrow	Slate-colored junco	Song sparrow	Lincoln's sparrow	Swamp sparrow	Fox sparrow	Towhee	Cardinal	Rose-breasted grosbeak	Indigo bunting	Dickcissel	Scarlet tanager	Summer tanager	Purple martin	Cliff swallow	Barn swallow
Habitat divisions.	Building																	+
	Yard			+						+	+	+			+	+		+
	Field		+	+		+	+	+				+	+					+
	Pasture		+	+	+								+					+
	Road	+	+	+				+		+		+	+				+	+
	Orchard		+			+				+	+	+	+					+
	Sprouts		+		+					+		+	+					
	Timber edge		+		+					+		+	+					
	Bluff		+	+	+	+		+	+	+	+	+	+	+	+	+		
	Creek timber		+	+	+	+	+	+	+	+	+	+	+	+	+			
	Salix-Pop		+	+	+	+	+	+	+	+	+	+	+			+		+
	Slough				+	+	+					+	+					
	Typha				+	+	+									+		+
	Lake shore																	+
	Lake															+		+
	Creek																	
	River																+	
Month.	December			+	+	+	+		+	+								
	November			+	+	+	+	+	+	+								
	October		+	+	+	+	+	+	+	+		+						
	September		+	+		+			+	+	+	+	+			+	+	+
	August		+						+	+	+	+	+	+	+	+	+	+
	July		+						+	+	+	+	+	+	+	+		+
	June		+						+	+	+	+	+	+	+	+	+	+
	May		+		+	+	+		+	+	+	+	+	+		+	+	+
	April	+	+	+	+	+	+	+	+	+			+		+	+		+
	March		+	+	+	+	+	+	+	+								
	February			+	+	+		+	+	+								
	January			+	+			+	+	+								

OCCURRENCE OF EACH SPECIES—CONTINUED.

Name of Bird.	Month.												Habitat divisions.																
	January	February	March	April	May	June	July	August	September	October	November	December	River	Creek	Lake	Lake shore	Typha	Slough	Salix-Pop.	Creek timber	Bluff	Timber edge	Sprouts	Orchard	Road	Pasture	Field	Yard	Building
Tree swallow				+	+	+	+	+	+					+	+	+	+		+		+				+				
Bank swallow					+	+	+	+	+				+	+	+										+				
Rough-winged swallow				+	+	+	+	+	+				+	+	+				+		+		+		+	+	+	+	+
Cedar waxwing	+		+	+	+	+		+	+		+								+	+	+							+	
Migrant shrike			+			+	+	+	+												+				+		+		
Red-eyed vireo					+	+	+	+	+										+	+	+								
Philadelphia vireo									+											+									
Warbling vireo					+	+	+	+	+									+	+	+	+			+				+	
Yellow-throated vireo				+	+		+	+	+										+		+								
Blue-headed vireo					+			+	+	+									+	+	+								
White-eyed vireo					+	+	+	+	+										+	+	+	+							
Bell's vireo					+	+	+	+	+										+	+	+	+	+	+	+	+			
Black-and-white warbler				+	+	+		+	+									+	+	+	+							+	
Prothonotary warbler					+	+		+	+						+				+	+	+							+	
Worm-eating warbler							+		+										+		+								
Blue-winged warbler						+		+	+										+		+								
Nashville warbler					+			+	+										+		+								

OCCURRENCE OF EACH SPECIES—CONTINUED.

	Name of Bird.	Orange-crowned warbler	Tennessee warbler	Northern parula warbler	Yellow warbler	Myrtle warbler	Magnolia warbler	Cerulean warbler	Black-poll warbler	Blackburnian warbler	Black-throated green warbler	Pine warbler	Ovenbird	Grinnell's water thrush	Louisiana water thrush	Kentucky warbler	Mourning warbler	Northern yellowthroat
Habitat divisions.	Building																	
	Yard				+	+			+					+				
	Field																	
	Pasture																	
	Road																	+
	Orchard				+													
	Sprouts																	
	Timber edge															+		
	Bluff		+	+	+	+	+	+		+			+			+	+	+
	Creek timber	+		+	+	+					+	+				+	+	+
	Salix-Pop	+	+	+	+	+							+	+		+	+	+
	Slough													+		+	+	+
	Typha													+				+
	Lake shore													+				
	Lake													+				
	Creek														+			
	River																	
Month.	December																	
	November					+												
	October	+	+			+												
	September		+	+	+					+	+	+	+	+		+	+	+
	August		+	+	+				+		+		+	+		+	+	+
	July			+	+											+		+
	June			+	+			+								+		+
	May	+	+	+	+	+	+						+	+		+	+	+
	April	+		+	+	+									+	+		
	March																	
	February																	
	January																	

OCCURRENCE OF EACH SPECIES—CONTINUED.

Name of Bird.	Habitat divisions.																	Month.											
	Building	Yard	Field	Pasture	Road	Orchard	Sprouts	Timber edge	Bluff	Creek timber	Salix-Pop	Slough	Typha	Lake shore	Lake	Creek	River	December	November	October	September	August	July	June	May	April	March	February	January
Yellow-breasted chat				+	+		+	+	+	+	+	+	+								+	+	+	+	+				
Wilson's warbler									+	+	+										+	+		+	+				
Canada warbler									+		+										+								
Redstart							+		+	+	+	+									+					+			
Mocking bird					+																								
Catbird		+			+	+			+	+	+									+			+	+	+				
Brown thrasher					+		+	+	+	+	+									+			+	+	+				
Carolina wren					+				+	+	+							+	+	+	+		+	+	+	+		+	+
Western house wren		+			+	+			+	+	+									+	+		+	+	+	+			
Winter wren					+	+			+		+		+						+	+							+	+	+
Short-billed marsh wren											+														+				
Prairie marsh wren											+	+	+							+					+	+			
Brown creeper		+				+				+	+							+	+	+						+	+	+	+
White-breasted nuthatch		+							+	+	+							+	+	+		+					+	+	+
Red-breasted nuthatch		+							+	+	+															+	+	+	+
Tufted titmouse		+						+	+	+	+							+			+		+	+	+	+	+	+	+
Chickadee		+			+	+			+	+	+							+	+	+	+	+	+	+	+	+	+	+	+

OCCURRENCE OF EACH SPECIES—CONCLUDED.

	Name of Bird.	Golden-crowned kinglet	Ruby-crowned kinglet	Blue-gray gnat catcher	Wood thrush	Gray-cheeked thrush	Olive-backed thrush	Hermit thrush	Robin	Bluebird
Habitat divisions.	Building									+
	Yard				+				+	+
	Field								+	+
	Pasture									+
	Road									+
	Orchard								+	+
	Sprouts									
	Timber edge			+						+
	Bluff	+	+	+	+	+	+	+	+	+
	Creek timber	+	+	+	+				+	+
	Salix-Pop	+	+	+	+				+	+
	Slough									
	Typha									
	Lake shore									
	Lake									
	Creek									
	River									
Month.	December	+							+	+
	November	+							+	+
	October	+	+						+	+
	September		+	+	+				+	+
	August			+	+				+	+
	July			+	+				+	+
	June			+	+				+	+
	May			+	+	+	+		+	+
	April		+	+				+	+	+
	March	+	+						+	+
	February	+							+	+
	January	+							+	+